TMDL FOR FECAL COLIFORMS FOR BAYOU LAFOURCHE, LOUISIANA

(SUBSEGMENT 020401)

May 21, 2004

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Prepared for

EPA Region VI
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EXECUTIVE SUMMARY

The Federal Clean Water Act requires states to identify waterbodies that are not meeting water quality standards and to develop total maximum daily pollutant loads for those waterbodies. A total maximum daily load (TMDL) is the amount of a pollutant that a waterbody can assimilate without exceeding the established water quality standard for that pollutant. Through a TMDL, pollutant loads can be allocated to point sources and nonpoint sources discharging to the waterbody. This report presents a TMDL that has been developed for fecal coliforms for Bayou Lafourche (subsegment 020401).

Bayou Lafourche is located in the Barataria basin in southern Louisiana. Subsegment 020401 extends from Donaldsonville to the Intracoastal Waterway at Larose. The subsegment is long (69 mi) but the drainage area is small (10 mi^2). The majority of the flow in this subsegment is water pumped into Bayou Lafourche from the Mississippi River at Donaldsonville. Land use in the subsegment is primarily cropland (sugar cane) and urban/residential. There are numerous small point source discharges.

Subsegment 020401 was listed on the February 29, 2000 Modified Court Ordered 303(d) List for Louisiana as not fully supporting designated uses, and was ranked as priority #3 for TMDL development. The suspected causes for impairment included fecal coliforms (pathogen indicators). The designated uses for this subsegment include primary contact recreation (which applies only during May through October) and secondary contact recreation (which applies all months of the year). During summer (May through October), the water quality standards for fecal coliforms are a log mean of no more than 200/100 mL (for at least 5 samples within 30 days), no more than 25% of the values exceeding 400/100 mL on an annual basis, and no more than 10% of the values exceeding 400/100 mL during any 30-day period. During the remainder of the year, the water quality standards for fecal coliforms are a log mean of no more than 1,000/100 mL (for at least 5 samples within 30 days), no more than 25% of the values exceeding 2,000/100 mL on an annual basis, and no more than 10% of the values exceeding 2,000/100 mL during any 30-day period. The water quality standards for the log mean and for the 75th percentile were used as numerical water quality targets for this TMDL.

The TMDL is summarized in Table ES.1. This TMDL consists of a 45% reduction of summer (May through October) fecal coliform loads, and no reduction of winter fecal coliform loads. Stormwater runoff from urban areas regulated under the Phase II Stormwater Management Program are included in the wasteload allocation (WLA).

Table ES.1. Fecal coliform TMDL for Bayou Lafourche (subsegment 020401).

Source	Summer Current Load (10^8 colonies/day)	Summer Reduction %	Summer Target Load (10^8 colonies/day)	Winter Current Load	Winter Reduction %	Winter Target Load (10^8 colonies/day)
WLA						
Treated wastewater	5.4	0	5.4	5.4	0	5.4
Thibodaux Stormwater	4.0	47	2.1	4.0	0	4.0
Lockport Stormwater	0.7	47	0.4	0.7	0	0.7
LA						
Wildlife	19.2	0	19.2	19.2	0	19.2
Failing Septic Systems	16.4	47	8.7	16.4	0	16.4
Other Stormwater	32.6	47	17.3	32.6	0	32.6
Mississippi Pumping	477	47	252	514	0	514
Total Load	556	45	306	592	0	592
Future Growth			38.2			74.0
MOS			38.2			74.0
TMDL			382			740

Because permit limits for point source discharges of treated wastewater require them to meet water quality standards at the end of the pipe, the WLA for all treated wastewater discharges consists of no reductions (both summer and winter). Because no reductions are required for treated wastewater, the reductions in the TMDL must come from stormwater and other man-made nonpoint sources. A combined explicit margin of safety (MOS) and future growth factor of 20% was incorporated by calculating the percent reductions so that the log mean and 75th percentile values were no greater than 80% of the water quality standards.

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1.0 INTRODUCTION

This report present a total maximum daily load (TMDL) for fecal coliforms for Bayou Lafourche from Donaldsonville to the Intracoastal Waterway at Larose (subsegment 020401). This subsegment was listed as not fully supporting all designated uses on both the February 29, 2000 Modified Court Ordered 303(d) List for Louisiana (EPA 2000a) and the Louisiana Department of Environmental Quality (LDEQ) Final 2002 303(d) List (LDEQ 2003a). Table 1.1 shows the suspected sources and suspected causes for impairment in the Modified Court Ordered 303(d) List as well as the priority ranking. The TMDL in this report was developed in accordance with Section 303(d) of the Federal Clean Water Act and the Environmental Protection Agency's (EPA) regulations in 40 CFR 130.7. The 303(d) listings for other pollutants in this subsegment are being addressed by EPA and LDEQ in other documents.

The purpose of a TMDL is to determine the pollutant loading that a waterbody can assimilate without exceeding the water quality standard for that pollutant and to establish the load reduction that is necessary to meet the standard in a waterbody. The TMDL is the sum of the wasteload allocation (WLA), the load allocation (LA), and a margin of safety (MOS). The WLA is the load allocated to point sources of the pollutant of concern, and the LA is the load allocated to nonpoint sources (NPS). The MOS is a percentage of the TMDL that takes into account any lack of knowledge concerning the relationship between pollutant loadings and water quality.

Table 1.1 Summary of 303(d) Listing of subsegment 020401 (EPA 2000a).

Subsegment Number	Waterbody Description	Suspected Sources	Suspected Causes	Priority Ranking (1 = highest)
020401	Bayou Lafourche-Donaldsonville to Intracoastal Waterway at Larose	Minor municipal point sources Package plants (small flows) Collection system failure Inflow and infiltration Domestic wastewater lagoon Land disposal Septic tanks Other Natural sources Unknown source Flow regulations/modifications Minor industrial point sources	Mercury Organic enrichment/low DO Pathogen indicators Nutrients Pesticides Salinity/TDS/chlorides/sulfates Siltation Suspended solids Turbidity Oil and grease Noxious aquatic plants	3

2.0 BACKGROUND INFORMATION

2.1 General Description

Bayou Lafourche is located in the Barataria basin in southern Louisiana (Figure 2.1). Bayou Lafourche is a distributary of the Mississippi River, starting at Donaldsonville and flowing generally southeast for approximately 108 miles to the Gulf of Mexico. Subsegment 020401 consists of Bayou Lafourche from Donaldsonville to the Intracoastal Waterway at Larose. The portion of Bayou Lafourche that is in this subsegment has a length of approximately 69 miles and has a local drainage area of approximately 10 mi^2 (based on the subsegment boundary). The local drainage area of Bayou Lafourche is small (i.e., average width of 765 ft) because there are natural ridges along each side of the bayou.

2.2 Land Use

Land use in subsegment 020401 is predominantly residential and cropland. The primary crop grown in this area is sugarcane. Approximate percentages of each land use in the subsegment are shown in Table 2.1.

Table 2.1. Land uses in subsegment 020401 based on GAP data (USGS 1998).

Land Use	Percent of Subsegment Area
Alluvial/Wetland Forest	0.5%
Forest	2.1%
Water	8.3%
Urban Residential	47.0%
Agriculture	42.1%
Total	100.0%

2.3 Flow Characteristics

As mentioned in Section 2.1, Bayou Lafourche is a distributary of the Mississippi River, which means that prior to human intervention, some of the water in the Mississippi River naturally flowed into Bayou Lafourche. In other words, Bayou Lafourche effectively

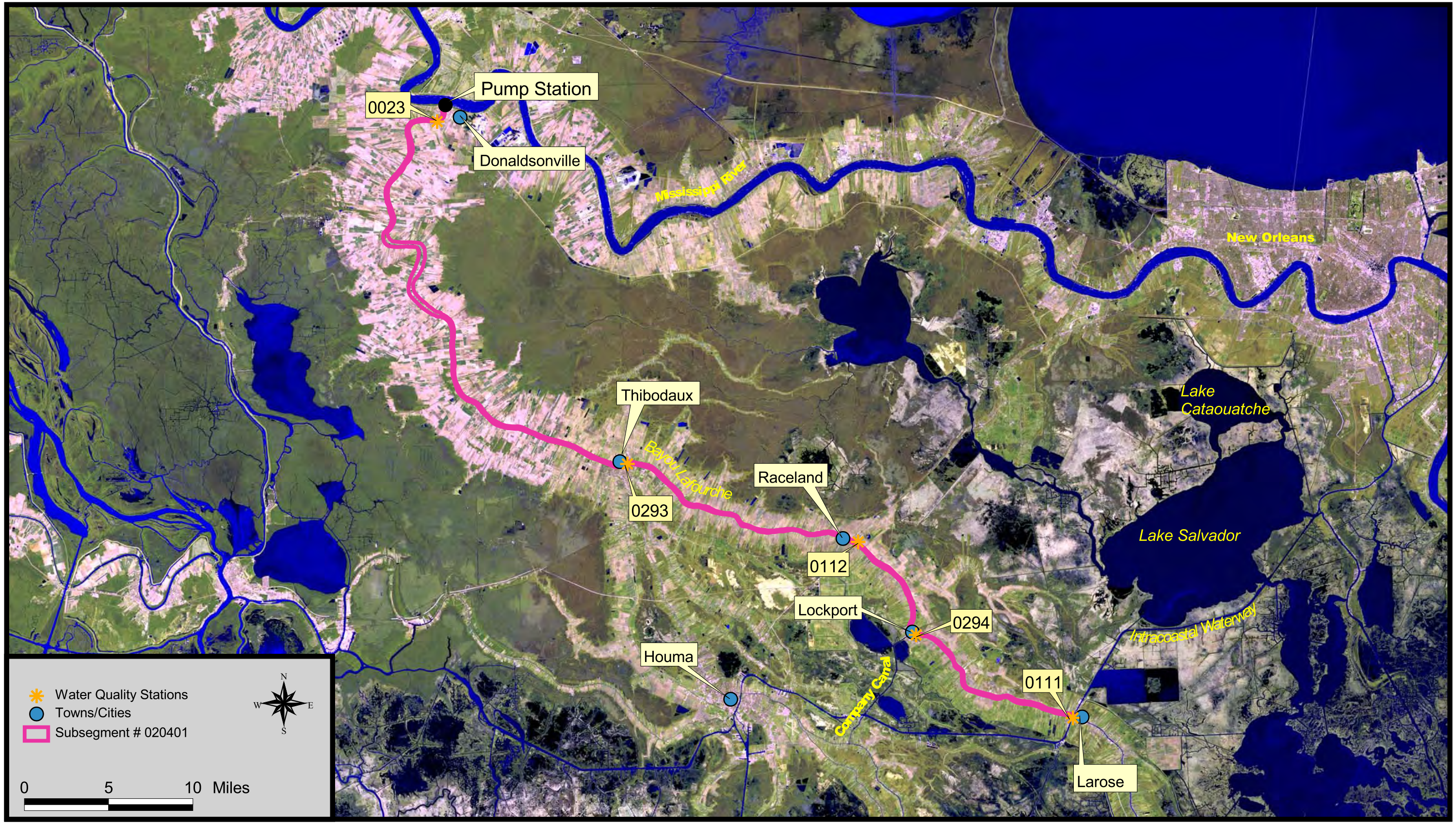

Figure 2.1. Map of Bayou Lafourche (subsegment 020401).

"distributed" water from the Mississippi River into the surrounding areas and eventually into the Gulf of Mexico. However, this natural flow pattern was cut off when levees were built along the Mississippi River many years ago. Later, a pumping station was built at Donaldsonville and began pumping water from the Mississippi River into Bayou Lafourche. This pumped water represents the primary source of flow in Bayou Lafourche.

The pumping station at Donaldsonville is operated by the Bayou Lafourche Freshwater District. Water is pumped into Bayou Lafourche at a relatively constant flow rate, except for infrequent occasions when water levels in Bayou Lafourche are excessively high due to local flooding. Based on conversations with Bayou Lafourche Freshwater District personnel and USGS flow data for Bayou Lafourche at Donaldsonville and Thibodaux, the normal flow rate in Bayou Lafourche is on the order of 200 cfs (Figure 2.2). Because the pumping is relatively constant and the drainage area is small, Bayou Lafourche does not respond to rainfall and drought as much as a typical upland stream does.

There are no significant hydraulic connections between Bayou Lafourche and other waterbodies (or surrounding marshes) between Donaldsonville and Raceland. Company Canal crosses Bayou Lafourche at Lockport and the Intracoastal Waterway crosses Bayou Lafourche at Larose. The Intracoastal Waterway typically flows in an eastward direction, bringing water from the Atchafalaya River into the Barataria basin.

At Thibodaux, there is a weir in Bayou Lafourche to maintain minimum water levels for the City of Thibodaux's water supply withdrawal. The bayou is somewhat tidally influenced downstream of this weir, but it is not tidally influenced upstream of the weir.

2.4 Designated Uses and Water Quality Standards

The designated beneficial uses that have been established by the LDEQ for Bayou Lafourche (subsegment 020401) are primary contact recreation, secondary contact recreation, propagation of fish and wildlife, and drinking water supply. The primary contact recreation use applies only during May through October; the secondary contact recreation use applies during all

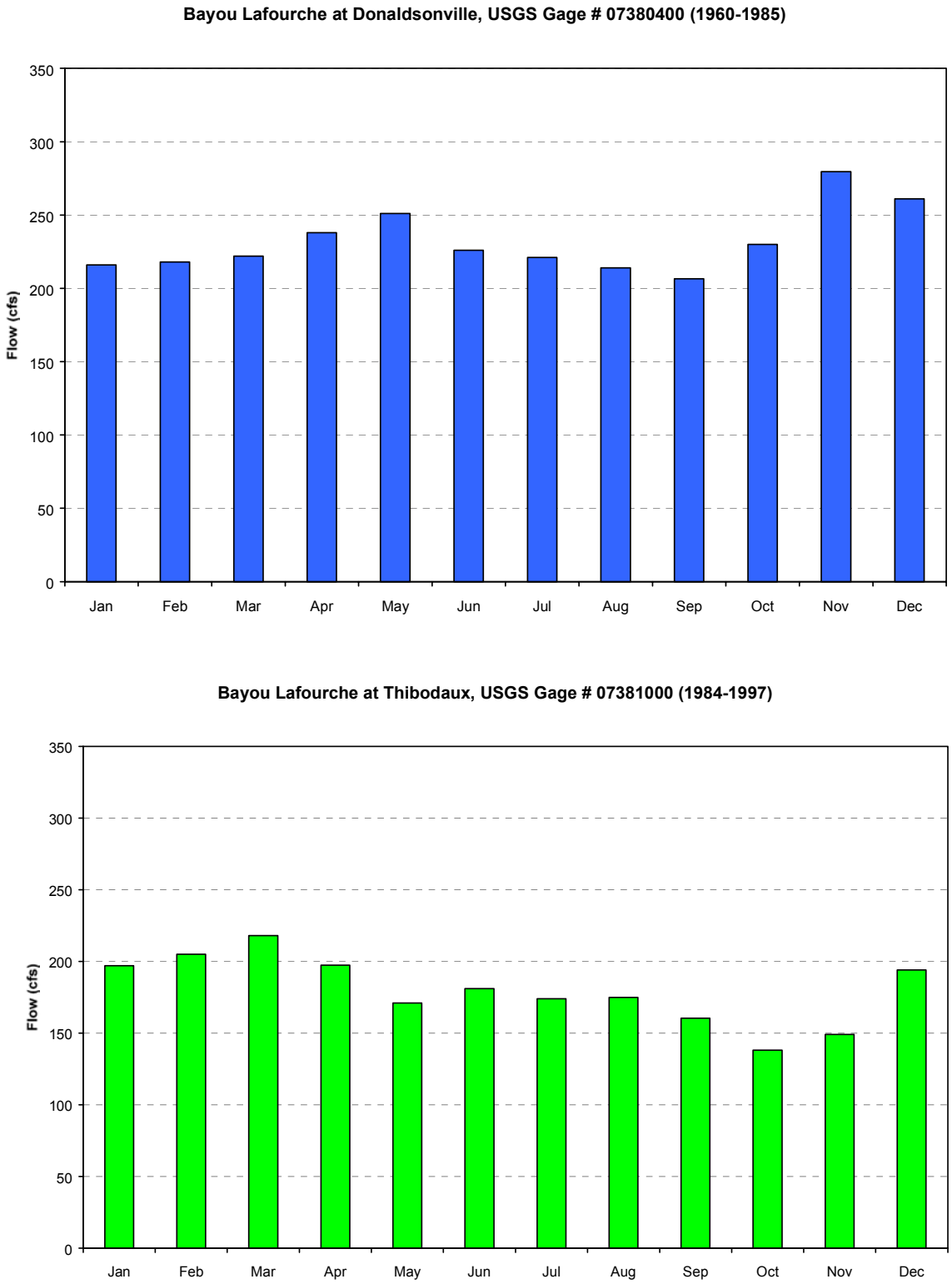

Figure 2.2. Monthly median flows for Bayou Lafourche.

months. In order to protect the primary and secondary contact recreation uses, the water quality standards for fecal coliforms have been set as follows (LDEQ 2003b):

Summer (May through October):

- The log mean of fecal coliform values shall not exceed 200/100 mL, based on not less than five samples collected during not more than 30 days.
- No more than 25% of fecal coliform values collected during a year may exceed 400/100 mL.
- No more than 10% of fecal coliform values collected during any 30-day period may exceed 400/100 mL.

Winter (November through April):

- The log mean of fecal coliform values shall not exceed 1,000/100 mL, based on not less than five samples collected during not more than 30 days.
- No more than 25% of fecal coliform values collected during a year may exceed 2,000/100 mL.
- No more than 10% percent of fecal coliform values collected during any 30-day period may exceed 2,000/100 mL.

Note: the log mean and geometric mean are mathematically equivalent.

The Louisiana water quality standards also include an antidegradation policy (LAC 33: IX.1109.A). This policy states that state waters exhibiting high water quality should be maintained at that high level of water quality. If this is not possible, water quality of a level that supports the designated uses of the waterbody should be maintained. Changing the designated uses of a waterbody to allow a lower level of water quality can only be achieved through a use attainability study.

2.5 Point Sources

A database of point source discharges in the Barataria and Terrebonne basins was previously compiled by EPA Region 6. This database was used to develop a list of point source discharges for subsegment 020401; this list is shown in Appendix A. Information on permitted flows for the facilities discharging to the subsegment was collected for a DO TMDL for this

subsegment (Cadmus 2003). For all but one of the facilities discharging to the subsegment, the EPA database did not include a list of effluent parameters being monitored. This information could be obtained through an extensive search of the LDEQ permit files in Baton Rouge, but resources were not available to do that for this TMDL. The standard industrial classification (SIC) codes provide some information concerning which discharges would have sources of fecal coliforms, but those codes are not available for many of the permits for this subsegment.

Based on conversations with LDEQ staff, fecal coliform permit limits for all point source discharges with general permits (except in oyster producing areas) are set to 200/100 mL for the monthly average and 400/100 mL for the daily maximum. The monthly average limit corresponds to the summer water quality standard for the maximum allowable log mean value during a 30-day period. The daily maximum limit corresponds to the summer water quality standard for the maximum allowable 10^{th} percentile value during a 30-day period. Essentially, the permit limits for fecal coliforms are based on meeting water quality standards at the "end of pipe" with no mixing zone.

2.6 Nonpoint Sources

Suspected nonpoint sources for subsegment 020401 have been listed in the EPA Modified Court Ordered 303(d) List for Louisiana (EPA 2000). These sources included collection system failure, inflow and infiltration, land disposal, septic tanks, natural sources, and unknown sources. "Collection system failure" apparently refers to overflows or other failures of wastewater collection systems. "Inflow and infiltration" refers to ambient stormwater leaking into sewer pipes, which can cause the wastewater collection system to overflow or it can cause the wastewater treatment plant to be overloaded (resulting in some wastewater bypassing the treatment facility and entering the receiving water without treatment).

Other discussions of nonpoint sources of pollution in the Barataria basin can be found in the LDEQ Nonpoint Source Annual Report (LDEQ 2001a) and on the web site for the LDEQ Nonpoint Source Program for the Bayou Lafourche Watershed (LDEQ 2002a). These documents both cite urban runoff and home sewage systems as nonpoint sources of fecal coliforms for Bayou Lafourche and for other parts of the Barataria basin.

2.7 Previous Water Quality Studies

There have been numerous hydrologic and hydraulic studies and several water quality studies for Bayou Lafourche. Most of the hydrologic and hydraulic studies have been performed by the U.S. Geological Survey (USGS), U.S. Army Corps of Engineers, Louisiana State University (LSU), Nicholls State University, and several other agencies and consulting firms. These studies have addressed issues related to water management alternatives (e.g., diversion rates and timing, channel modifications) and their effects on water levels, salinity, etc.

Several relevant water quality studies were identified for Bayou Lafourche; these are listed below:

1) Inventory of home sewage systems in parts of the Barataria and Terrebonne basins. This report was prepared by the South Central Planning and Development Commission (SCPDC) under contract to LDEQ.

2) "Bacteriological Criteria for Recreational Waters Along the Tangipahoa River". This report was prepared by researchers at Tulane University under contract to LDEQ. The study was conducted in the Tangipahoa River basin, which is in southeastern Louisiana. The primary emphasis of the report is the comparison of various bacteriological indicator criteria for determining whether recreational uses are being met or not. The sampling and analysis do not provide any information for estimating relative magnitudes of different sources of fecal coliforms in southern Louisiana.

3) "Survey Report for the Bayou Lafourche Low Flow Time of Travel Study". This is an LDEQ report that summarizes dye studies conducted for time of travel in June 1991 when the stream flow averaged 156 cfs.

4) "High Flow Time of Travel Study on Bayou Lafourche". This is an LDEQ report that summarizes dye studies conducted for time of travel in May 1994 when the stream flow averaged 327 cfs.

5) "Water Quality Impact of Proposed Diversion of Water from Lake Verret to Bayou Lafourche". This study was conducted in 1998 by the University of Southwestern Louisiana and it evaluates the potential water quality impacts of diverting water from Lake Verret into Bayou Lafourche via the Cancienne Canal.

6) "A Survey of the Fish Fauna of Bayou Lafourche". This study was conducted by Nicholls State University and it includes species composition, distribution, and abundance of fishes along Bayou Lafourche from August 1994 through July 1995.

3.0 CHARACTERIZATION OF EXISTING WATER QUALITY

3.1 Comparison of Observed Data to Standards

Historical fecal coliform data have been collected by LDEQ at five stations in Bayou Lafourche within subsegment 020401. These stations are listed in Table 3.1 and their locations are shown in Figure 2.1. Table 3.1 also shows a comparison of observed fecal coliform data and water quality standards. The water quality standards used for the comparison are the values that should not be exceeded more than 25% of the time on an annual basis (400/100 mL for summer and 2,000/100 mL for winter as described in Section 2.4). The standards used in this comparison are the same as the criteria used by LDEQ in their assessment methodology presented in their 305(b) report (LDEQ 2002b). As shown in Table 3.1, the percent exceedance during winter was less than 25% for all five stations; therefore, the designated use of secondary contact recreation is being supported during winter. For summer, though, the percent exceedance was greater than 25% for three of the five stations; this indicates that the designated use of primary contact recreation is not being met throughout the entire subsegment. It is not known why percent exceedances are higher for the three upper stations (0023, 0293, and 0112) than for the two lower stations (0294 and 0111). Both of the two lower stations are located near waterbodies that cross Bayou Lafourche (Company Canal crosses at Lockport and the Intracoastal Waterway crosses Larose); these waterbodies could possibly be bringing other water into Bayou Lafourche. Also, the data for station 0111 are only for one year (2000), which was a dry year in which fecal coliform contributions from storm runoff were probably less than usual. If fecal coliform data had been collected at station 0111 for the entire 1991-2000 period, the data for that station might be similar to data for the other stations.

3.2 Trends and Patterns in Observed Data

The LDEQ historical fecal coliform data for 1991-2000 are shown graphically in Figures 3.1 through 3.5 (all figures for Section 3 are located in Appendix B). These plots show the large variability that is typical for most fecal coliform data. The data for station 0293 (at Thibodaux) appear to have a slight downward trend, but data for the other stations do not show

Table 3.1. Summary of LDEQ fecal coliform data for Bayou Lafourche (subsegment 020401).

Station No.	Description	Period of Record Used	# of Data	Percent of Values Exceeding Standard for 75th Percentile		Support Designated Use?	
				Summer	Winter	Summer	Winter
0023	Bayou Lafourche near Donaldsonville	1991-1998	42	58%	9%	No	Yes
0293	Bayou Lafourche at Thibodaux	1991-2000	71	47%	6%	No	Yes
0112	Bayou Lafourche at Raceland	1991-1998	41	42%	18%	No	Yes
0294	Bayou Lafourche at Lockport	1991-1998	41	21%	5%	Yes	Yes
0111	Bayou Lafourche at Larose	2000	12	14%	0%	Yes	Yes

Notes: 1. For summer, the 75th percentile standard is 400/100 mL (primary contact recreation).
2. For winter, the 75th percentile standard is 2000/100 mL (secondary contact recreation).
3. For stations 0023, 0112, and 0111, data exist prior to 1991 but were not used.

any long terms trends. The apparent downward trend at station 0293 could be influenced by the fact that the last several years of data were collected during dry years. As mentioned above, the fecal coliform contributions from storm runoff were probably less than usual during those years

To provide further insight, these fecal coliform data were plotted against 3-day antecedent precipitation as shown in Figures 3.6 through 3.10. In general, most of the fecal coliform counts during wet conditions tended to be relatively high. However, there were not strong correlations between fecal coliform counts and precipitation.

Also, the fecal coliform data were plotted by day of the year to examine any seasonal patterns (Figures 3.11 through 3.15). From visual observations of these plots, the summer values tended to be slightly higher than winter values for some of the stations. This may or may not be related to the fact that the normal monthly precipitation amounts are higher during May through September (5 to 8 inches per month) than during other months (3 to 6 inches per month). There are definitely more values above the log mean water quality standard during summer than during winter.

4.0 TMDL DEVELOPMENT

4.1 Seasonality and Critical Conditions

Federal regulations in 40 CFR 130.7 require TMDLs to include seasonal variations and take into account critical conditions for stream flow, loading, and water quality parameters. For this TMDL, seasonality was accounted for by developing a seasonal TMDL based on the water quality standards that are applicable for each season. Additionally, the observed fecal coliform data were plotted by day of the year to check for any seasonal patterns (see Section 3.2).

The requirement to account of critical conditions is intended to make sure that water quality standards are maintained not just for average conditions, but also for critical conditions that occur infrequently. This limits the frequency of occurrence of standards violations to an acceptably low level. For most water quality parameters, the water quality standard is listed as a single value that must be maintained at all times except when conditions are more critical than a certain set of conditions. For example, the DO standards for non-tidal waterbodies in Louisiana are applicable at all times except when the flow is less than the 7Q10 flow. Therefore, DO TMDLs require the estimation of allowable loads for 7Q10 flow conditions.

For fecal coliforms, though, the water quality standards include values that should not be exceeded more than 25% of the time based on all data collected during applicable periods of the year (i.e., based on data collected during both critical and non-critical conditions). Because they are written this way, these standards allow a fecal coliform TMDL to be developed by looking at all conditions within applicable periods of the year and evaluating the percent of values exceeding the standard. For this TMDL, critical conditions for flow, temperature, etc. were not determined, but critical conditions were accounted for by setting the numeric water quality target to the standards that should not be exceeded more than 25% of the time. The 75^{th} percentile of water quality values was compared to the numeric target to determine compliance with water quality standards.

4.2 Assessment of Pollutant Sources

A list of sources of fecal coliforms to Bayou Lafourche was developed and the relative contribution of each source was estimated. The potential sources, their locations, and miscellaneous comments concerning the sources are listed in Table 4.1.

Table 4.1. Sources of fecal coliforms to Bayou Lafourche (subsegment 020401).

Source	Location	Comments
Point sources	Distributed along the entire length of the subsegment	Should not cause any violations of water quality standards (permit limits are based on meeting standards at end of pipe)
Water pumped from Mississippi River	at Donaldsonville	Median values of fecal coliform counts for the Mississippi River east of Plaquemines (LDEQ station 0319) were 130/100 mL for summer and 140/100 mL for winter (based on 1991-2002 data)
Failing septic systems	Distributed along the entire length of the subsegment	Considered to be significant by LDEQ and SCPDC (see Section 2.6). Accurate estimate of number of failing septic systems could not be obtained for this TMDL.
Runoff from residential and urban areas	Distributed along the entire length of the subsegment	Considered to be significant by LDEQ and SCPDC (see Section 2.6). Urban runoff is most significant within towns (Donaldsonville, Thibodaux, Raceland, and Larose).
Runoff from cropland and pasture	Distributed along the entire length of the subsegment	Expected to be negligible. Pasture is negligible percentage of total drainage area. No known land application of manure or sludge from wastewater treatment plants in this subsegment.
Wildlife and waterfowl	Distributed along the entire length of the subsegment	Expected to be minor. No large forested areas for wildlife. Does not attract large numbers of waterfowl.

The EPA Bacterial Indicator Tool spreadsheet (EPA 2000b) was used to estimate relative contributions of different sources of fecal coliforms for Bayou Lafourche. The spreadsheet is designed to estimate fecal coliform accumulation rates for input to a watershed model such as HSPF. For this TMDL, though, the spreadsheet was used to estimate relative loadings to the stream. To estimate the percentage of fecal coliforms that actually enter the stream would require a detailed analysis such as applying the HSPF model to the Bayou Lafourche drainage area. A detailed analysis was not feasible for this TMDL due to the lack of available data and resources. Therefore, for simplicity, it was assumed that all fecal coliforms accumulating on the land

surface would enter the stream. A printout of the spreadsheet showing values used for Bayou Lafourche is included in Appendix C.

For runoff from built-up (urban and residential) areas, accumulation rates from Horner (1992) were used. Subcategories of urban land uses (commercial, mixed, residential, transportation and utilities) were assigned different accumulation rates. Incorporated areas within US Census defined urban areas are subject to Phase II stormwater regulations (EPA 2000c). Approximately half the subsegment is apart of the US Census defined Houma urban area (US Census 2002). Thibodaux and Lockport are the only incorporated areas in the Houma urban area in the subsegment (US Census 2002); therefore, fecal coliform accumulations from their urban areas were classified as point sources to be consistent with the Phase II storm water regulations. The lengths of areas along the subsegment associated with each community were used to determine the urban land uses for each point source and the nonpoint urban sources in the subbasins of the subsegments. Subcategories of urban land uses were split among the point and nonpoint urban areas based on the proportion of the length of the areas to the subbasin length. It was estimated that Thibodaux accounts for approximately 60% of the commercial and mixed urban land uses in its subbasin, and 10% of the residential and transportation and utilities urban land uses. Lockport was estimated to account for approximately 25% of all urban land uses in its subbasin.

For contributions from wildlife and waterfowl, fecal coliform accumulation rates were based on the animal density, which was assumed to be five animals per square mile for each animal included in the spreadsheet (ducks, geese, deer, beaver, raccoons, and "other animals").

For failing septic systems, fecal coliform contributions were calculated based on the assumptions that 40% of septic systems are failing, each failing septic system serves an average of 2.5 people, and each system generates 70 gal/day per person with a fecal coliform concentration of 10,000/100 mL. An accurate count of the number of failing septic systems in the subsegment is currently not available. The 40% failure rate was used in approved fecal coliform TMDLs for Mississippi (MDEQ 1999a,b). A report by the South Central Planning and Development Commission (SCPDC) reports an inventory of home sewage systems that was developed for LDEQ for parts of the Barataria and Terrebonne basins including Bayou

Lafourche (SCPDC 2001). Based on the GIS data collected for this report, SCPDC has determined that there are approximately 618 individual sewer treatment facilities located in subsegment 020401 (personal communication, 7/24/03, Scott Leger, SCPDC). The flow rate and fecal coliform count for failing septic systems were default values in the spreadsheet based on information from Horsley & Witten (1996).

The spreadsheet was modified slightly to include fecal coliform contributions from pumped inflows and point sources. For pumped inflows from the Mississippi River, the contribution of fecal coliforms was estimated by multiplying the median fecal coliform values for the Mississippi River during summer and winter (130/100 mL and 140/100 mL, respectively) by a typical pumping rate of 150 cfs (the pumping rate was based on conversations with personnel operating the pumps). For point source discharges of treated wastewater, the contribution of fecal coliforms was estimated by multiplying the monthly average general permit limit for fecal coliforms (200/100 mL in the summer and 1000/100 mL in the winter) by the sum of the discharge permitted flows.

A summary of the estimated relative contributions of point sources and nonpoint sources of fecal coliforms is shown in Table 4.2. The two largest sources are water pumped from the Mississippi River and runoff from residential and urban areas. Although failing septic systems have been considered to be a significant nonpoint source (see Section 2.6), they were estimated to represent less of the total load than these two sources.

Table 4.2. Relative magnitudes of different sources of fecal coliforms for subsegment 020401.

Source	Percent of total loading	
	Summer	Winter
Point sources (treated wastewater)	1.0%	0.9%
Water pumped from Mississippi River	87.2%	88.0%
Failing septic systems	1.5%	1.4%
Runoff from residential and urban areas	6.8%	6.4%
Wildlife and waterfowl	3.5%	3.3%

4.3 TMDL

This TMDL was developed by calculating a percent reduction from existing levels and then estimating maximum allowable "loads" of fecal coliforms (i.e., number of fecal coliforms per unit of time). The overall percent reduction needed in fecal coliforms was determined by taking the observed data for each season and multiplying them by a reduction factor until the log mean and 75th percentile values of the data were less than the target values. Target values were set to 80% of the seasonal water quality standards (to incorporate a 10% explicit margin of safety and 10% future growth component). This procedure of calculating the overall percent reduction was repeated for each LDEQ monitoring station with fecal coliform data within this subsegment. The percent reduction was applied only to observed data that were greater than the log mean water quality standard (200/100 mL for summer and 1000/100 mL for winter) because it was not considered feasible to reduce fecal coliform counts that were already below the water quality standard. For summer, the required percent reductions at the five water quality monitoring stations ranged from 0% to 77%, with an average of 45%. No reductions were required for winter. These calculations are shown in Appendix D and the results are summarized in Table 4.3.

Table 4.3. Summary of percent reductions needed to meet standards.

Station No.	Station Description	Percent Reduction Needed	
		Summer	Winter
0023	Bayou Lafourche near Donaldsonville	77%	0%
0293	Bayou Lafourche at Thibodaux	75%	0%
0112	Bayou Lafourche at Raceland	71%	0%
0294	Bayou Lafourche at Lockport	0%	0%
0111	Bayou Lafourche at Larose	0%	0%

This methodology (applying a percent reduction to individual data points) addresses the variability associated with both the observed data and the water quality standards. The water quality standards specify that the log mean should be calculated using not less than five samples collected during not more than 30 days. Although none of the fecal coliform data being used in this TMDL consisted of five samples collected within a 30-day period, it was still considered useful to calculate the percent reductions based on meeting the log mean standard as well as the

75th percentile standard. Requiring the data to meet both standards made the analysis more conservative.

Table 4.4 shows an estimate of the current fecal coliform load to the subsegment, along with loads that would result from applying the reductions specified for the TMDL. These reductions are discussed below.

Table 4.4. TMDL for Bayou Lafourche (subsegment 020401).

Source	Summer Current Load (10^8 colonies/day)	Summer Reduction %	Summer Target Load (10^8 colonies/day)	Winter Current Load	Winter Reduction %	Winter Target Load (10^8 colonies/day)
WLA						
Treated Wastewater	5.4	0	5.4	5.4	0	5.4
Thibodaux Stormwater	4.0	47	2.1	4.0	0	4.0
Lockport Stormwater	0.7	47	0.4	0.7	0	0.7
LA						
Wildlife	19.2	0	19.2	19.2	0	19.2
Failing Septic Systems	16.4	47	8.7	16.4	0	16.4
Other Stormwater	32.6	47	17.3	32.6	0	32.6
Mississippi Pumping	477	47	252	514	0	514
Total Load	556	45	306	592	0	592
Future Growth			38.2			74.0
MOS			38.2			74.0
TMDL			382			740

4.4 Wasteload Allocation

As discussed in Section 2.5, LDEQ's policy is to set permit limits for fecal coliforms no higher than water quality standards (i.e., standards are met at end of pipe). Therefore, as long as point source discharges of treated wastewater contain fecal coliforms levels at or below these permit limits, they should not cause any violations of water quality standards for fecal coliforms. For this TMDL, the WLA consists of no reductions for discharges of treated wastewater.

As discussed in Section 4.2, fecal coliforms from runoff from urban land uses associated with Thibodaux and Lockport are included in the wasteload allocation for this TMDL because they are regulated under the Phase II Stormwater Management Program. Because reductions are

not being applied to all fecal coliform sources, in order to achieve the 45% load reduction a 47% reduction is applied to those sources that are being reduced, including the urban runoff from Thibodaux and Lockport.

4.5 Load Allocation

Based on the assessment of pollutant sources in Section 4.2, it will be impossible to achieve a 45% reduction in fecal coliform levels without reducing the inputs to Bayou Lafourche from the Mississippi River (Table 4.4). However, this analysis assumed that fecal coliform levels in the Mississippi River were below the log mean water quality standards. Therefore, the Mississippi River water should not be causing any violations of water quality standards in Bayou Lafourche and no reductions should be required for loading from the Mississippi River. This indicates that the assessment of pollutant sources in Section 4.2 is likely underestimating contributions from sources other than the Mississippi River water (e.g., septic systems, urban runoff, waterfowl and wildlife). The TMDL shown in Table 4.4 assumes a 47% reduction in fecal coliform loads from pumped Mississippi River water.

The portion of the total nonpoint source loading that is natural (rather than man-induced) is difficult to estimate because the loading from the Mississippi River inflow includes both natural and man-induced loading. The natural loading that originates from within the Bayou Lafourche subsegment would be due primarily to wildlife and waterfowl, which represented less than 3% of the total loading. No reduction was assigned to this load.

The TMDL assumes a 47% reduction in the known man-induced fecal coliform loads to the subsegment (urban and residential runoff, and failing septic systems).

4.6 Margin of Safety

Section 303(d) of the Federal Clean Water Act and EPA's regulations at 40 CFR 130.7 both require the inclusion of a margin of safety in the development of a TMDL. An explicit combined margin of safety and future growth factor of 20% was incorporated in this TMDL by calculating the percent reductions so that the log mean and 75th percentile values were no greater

than 80% of the seasonal water quality standards. In the TMDL, both the margin of safety and the future growth factor were set to 10% of the TMDL.

5.0 OTHER RELEVANT INFORMATION

Utilizing funds under Section 106 of the Federal Clean Water Act and under the authority of the Louisiana Environmental Quality Act, LDEQ has established a program for monitoring the quality of the state's surface waters. The LDEQ Surveillance Section collects surface water samples at various locations, utilizing appropriate sampling methods and procedures for ensuring the quality of the data collected. The objectives of the surface water monitoring program are to determine the quality of the state's surface waters, to develop a long-term database for water quality trend analysis, and to monitor the effectiveness of pollution controls. The data obtained through the surface water monitoring program is used to develop the state's biennial 305(b) report (*Water Quality Inventory*) and the 303(d) list of impaired waters. This information is also utilized in establishing priorities for the LDEQ nonpoint source program.

The LDEQ has implemented a watershed approach to surface water quality monitoring. Through this approach, the entire state is sampled over a four-year cycle. Long-term trend monitoring sites at various locations on the larger rivers and Lake Pontchartrain are sampled throughout the four-year cycle. Sampling is conducted on a monthly basis to yield approximately 12 samples per site each year the site is monitored. Sampling sites are located where they are considered to be representative of the waterbody. Under the current monitoring schedule, approximately one half of the state's waters are newly assessed for 305(b) and 303(d) listing purposes for each biennial cycle with sampling occurring statewide each year. The four-year cycle follows an initial five-year rotation which covered all basins in the state according to the TMDL priorities. This will allow the LDEQ to determine whether there has been any improvement in water quality following implementation of the TMDLs. As the monitoring results are evaluated at the end of each year, waterbodies may be added to or removed from the 303(d) list.

6.0 FUTURE WATERSHED ACTIVITIES

Point source wasteload allocations will be implemented through LPDES permit procedures.

In Louisiana, nonpoint source load allocations will be addressed through the LDEQ Nonpoint Source Management Program. The *Louisiana's Nonpoint Source Management Plan* (Plan) (LDEQ 2000) states that TMDLs are being developed through a close relationship between LDEQ and EPA Region 6. It further states that, "management strategies outlined within this document (both statewide and watershed) will be implemented in each of the watersheds where water quality problems have been attributed to nonpoint sources of pollution." On page ii, Objective 3 of the watershed management strategies is to "utilize pollutant load reductions of the TMDL to develop nonpoint source pollution reduction strategies for each of the watersheds ... that have water quality problems identified." Also, Objective 7 provides a tracking process for evaluating progress in reduction in loadings of fecal coliform bacteria.

The Plan includes a discussion of a number of nonpoint source activities and provides Best Management Practices (BMPs) that can be used to achieve the nonpoint source load reductions for fecal coliform as established in the TMDLs. The Plan broadly discusses programs including agriculture, forestry, home sewerage systems, hydromodification, urban runoff, construction, and resource extraction.

The Plan provides fourteen different BMPs that can be used to reduce fecal coliform loads. Also provided with each of these BMPs is an evaluation of the effectiveness of the BMP given as a high, medium, or low ranking. Additional evaluations should be conducted to determine the most likely source of fecal contamination in this watershed and to identify localized hot spots to be targeted for effective BMP implementation. These and other BMPs may be implemented at a scale adequate to achieve the load reductions as established in the TMDL.

7.0 PUBLIC PARTICIPATION

When EPA establishes a TMDL, federal regulations require EPA to publicly notice and seek comment concerning the TMDL. These TMDLs have been prepared under contract to EPA. After developing this TMDL, EPA prepared a notice seeking comments, information, and data from the general public and affected public. Comments and additional information were submitted during the public comment period and this TMDL was revised accordingly. Responses to these comments and additional information are included in Appendix E. EPA has transmitted the revised TMDL to the LDEQ for implementation and incorporation into LDEQ's current water quality management plan.

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APPENDIX A

List of Point Source Discharges

LIST OF POINT SOURCE DISCHARGES FOR SUBSEGMENT 020401 (BAYOU LAFOURCHE)

FILE_NUM	NPDES	LPDES	COMPANY	FACILITY	LOCATION	FAC_TYPE	REC_WATER	SIC
LAG530322			LAFOURCHE PAR SCH BD	LAFOURCHE PH ALTERNATIVE SCH N CAMPUS	THIBODAUX 2134 HWY 308	PUBLIC SCH	BAYOU LAFOURCHE	4952
LAG530318			LAFOURCHE PAR COUNCIL	VALENTINE PONTOON BRIDGE	VALENTINE HWY 308 & HWY 1	BRIDGE	DIRECTLY INTO BAYOU LAFOURCHE	4952
LAG530043			AUCOIN'S SEWER UTILITY SERVICE	ELMFIELD SUBDIVISION	LABADIEVILLE, OFF HWY 308	4,000 GPD OX POND	BAYOU LAFOURCHE	4952
LAG530874			JOEYS SEAFOOD & LOUNGE		RACELAND 5365 HWY 1	RESTAURANT/LOUNGE	BAYOU LAFOURCHE	4952
LAG540861			LAFOURCHE PAR RECREATION DIST 2	EMERGENCY RECREATION & COMM CNTR	RACELAND TEXAS ST & SENIOR CITIZENS DR	COMMUNITY CNTR	GAZZO CANAL & BAYOU LAFOURCHE	4952
LAG110037			ELRAY KOCKE SVC INC	HWY 1 CONCRETE PLT	DONALDSONVILLE, HWY 1 S	CONCRETE PLT	OLD BAYOU MCCALL-BAYOU LAFOURCHE	3273
LAG540147			AUCOIN'S SEWER UTILITY SERVICE	AUCOINS TRAILER PARK	DONALDSONVILLE, OFF HWY 308	12,000 GPD RESIDENTIAL STP	BAYOU LAFOURCHE	4952
LAG560032			AUCOIN'S SEWER UTILITY SERVICES	ST JUDE SUBD SEWER SYS	DONALDSONVILLE, LA 18	35,200 GPD (2) MECH. STPS	BAYOU NAPOLEON-BAYOU LAFOURCHE	4952
LA0100676			TALLULAH WATER CO	FKA PEOPLES WATER CO	DONALDSONVILLE, 303 MISSISSIPPI ST	WATER TREATMENT PLANT	BAYOU LAFOURCHE	4941
LAG560027			AUCOIN'S SEWER UTILITY SERVICE	MAGNOLIA SUBD	OFF HWY 308 BTWN NAPOLEONVILLE & DONALD	RESIDENTIAL STP	BAYOU NAPOLEON TO BAYOU LAFOURCHE	4952
LAG540154			AUCOIN'S SEWER UTILITY SERVICE	KINGSTON SUBD	LABADIEVILLE, OFF HWY 1	18,000 GPD RESIDENTIAL STP	BAYOU LAFOURCHE	4952
LAG540155			AUCOIN'S SEWER UTILITY SERVICE	LABADIE ESTATES SUBD	LABADIEVILLE, OFF HWY 389	17,600 GPD RESIDENTIAL STP	BAYOU NAPOLEON-BAYOU LAFOURCHE	4952
LAG530679			ROUSES ENTERPRISES INC	RACELAND STORE #3	RACELAND 3880 HWY 1	GROCERY STORE/STP	BAYOU LAFOURCHE	4952
LAG530185			ECONOMY INN		LOCKPORT 5656 HWY 1	MOTEL	BAYOU LAFOURCHE	4952
LAG540460			LAFOURCHE PH SCH BD	RACELAND LOWER ELEM SCH	RACELAND 4101 HWY 308 S	PUBLIC SCH	BAYOU LAFOURCHE	4952
LAG560112			LAFOURCHE PH SCH BD	RACELAND JR HIGH SCH	RACELAND 3737 HWY 308	PUBLIC SCH	BAYOU LAFOURCHE	4952
LAG540454			LAFOURCHE PAR SCH BD	CENTRAL LAFOURCHE HIGH SCHOOL	MATHEWS, 4820 HWY 1	PUBLIC SCHOOL	BAYOU LAFOURCHE	4952
LA0098060			THIBODAUX CITY OF	THIBODAUX WTR WORKS	THIBODAUX, .2 M N OF CANAL ST & HWY 308	WATER PLANT	PIPE-BAYOU LAFOURCHE-GULF OF MEXICO	4941
LAG540498			MATHEWS LA COMMERCIAL PROP DEV CO	WAL-MART SHOPPING CENTER	MATHEWS, LA HWY 1	EXTENDED AERATION	BAYOU LAFOURCHE	4952
LAG530559			LITTLE FRENCH MARKET, INC		THIBODAUX, 212 BAYOU RD	RESTAURANT STP	BAYOU LAFOURCHE	4952
LAG530268			JB LEVERT LAND CO INC	USDA BLDG	THIBODAUX HWY 308	220 GPD HOOT AEROBIC TREATMENT	BAYOU LAFOURCHE	4952
LAG530407			PAPPYS FRIED CHICKEN		RACELAND, 3679 LA 1	RESTAURANT STP	BAYOU LAFOURCHE	4952
LA0107361			CAD INC (CARWASH)		RACELAND, HWY 1 ACROSS FROM AYO ST	CARWASH	BAYOU LAFOURCHE VIA UNNAMED DITCH	7542
LAG540364			HOUSING AUTHORITY OF LAFOURCHE PH	LAFOURCHE HOUSING PROJECT	THIBODAUX, ON LA HWY 308, LASSEIGNE ROAD	STP	BAYOU LAFOURCHE	4952
LAG540852			MCDONALDS CORP THIBODAUX		THIBODAUX,	FAST FOOD RESTAURANT	BAYOU LAFOURCHE - DONALDSONSON TO I	4952
LAG530887			SITA INC	DEAUVILLE MOTEL & LOUNGE	THIBODAUX 1717 ST MARY ST	MOTEL	BAYOU LAFOURCHE	4952
LAG560005			AUCOIN'S SEWER UTILITY SERVICE	MAGNOLIA SUB	KLOTZVILLE, NORTH OF, ON HWY 308	SEWERAGE PLANT	BAYOU LAFOURCHE	
LA0063303			LAFOURCHE PARISH HOUSING AUTHORITY	THIBODAUX, LA-80-7-A	THIBODAUX, LASSEIGNE RD. OFF HWY 308	SEWERAGE PLANT	BAYOU LAFOURCHE	
GP16165		LAG750203	ABCD REALITY INC	WAG-A-PAK VIII (THIBODAUX)	THIBODAUX, 108 E BAYOU RD (HWY 308)	CAR WASH	BAYOU LAFOURCHE	
LAG530005			AMERICAN BIOCHEMICAL CORPORATION	LOCKPORT	LOCKPORT, 8240 HWY 308	SEWERAGE PLANT	BAYOU LAFOURCHE	
WP4407		LAG750234	ARABIE TRUCKING CO	THIBODAUX	THIBODAUX, 1900 HWY 1	VEHICLE REPAIR	BAYOU LAFOURCHE	
WG010284		LAG530043	AUCOIN'S SEWER UTILITY SERVICE	ELMFIELD SUB	LABADIEVILLE, HWY 308	OXIDATION POND	BAYOU LAFOURCHE	
WG020059		LAG540154	AUCOIN'S SEWER UTILITY SERVICE	KINGSTON SUB	LABADIEVILLE, HWY 1	SEWERAGE PLANT	BAYOU LAFOURCHE	
WG020054	LA0083062	LAG540155	AUCOIN'S SEWER UTILITY SERVICE	LABADIE ESTATES SUBD	LABADIEVILLE, HWY 398	SEWERAGE PLANT	BAYOU LAFOURCHE	
WG010062		LAG530068	BECK'S	RACELAND	RACELAND, 4293 HWY 1	SEWERAGE PLANT	BAYOU LAFOURCHE	

FILE_NUM	NPDES	LPDES	COMPANY	FACILITY	LOCATION	FAC_TYPE	REC_WATER	SIC
WG020905		LAG540185	BOB DEAN ENTERPRISES INC	RACELAND MANOR	RACELAND, 4302 HWY 1	SEWERAGE PLANT	BAYOU LAFOURCHE	
WP2767	LAR00B997	LA0084069	BOLLINGER SHIPYARDS LOCKPORT, LLC	LOCKPORT	8365 LA HIGHWAY 308, 4 MI S OF LOCKPORT	SHIPYARD	BAYOU LAFOURCHE	
WP2047		LAG750253	BOLOTTE CARWASH	LABADIEVILLE	LABADIEVILLE, 2564 HWY 1	CAR WASH	BAYOU LAFOURCHE	
WG010415		LAG530100	BURGER KING CORP	RESTAURANT #6057	MATHEWS, 4870 HWY 1	RESTAURANT	BAYOU LAFOURCHE	
WP3594			CAJUN WAGON	THIBODAUX	THIBODAUX, 1249 HWY 1	CRAWFISH	BAYOU LAFOURCHE	
LAR05M358			CAMECO IND INC	CAMECO IND INC	THIBODAUX, P.O. BOX 986	INDUSTRIAL PRODUCTS	BAYOU LAFOURCHE	
WP3518	LA0088714	LAG530672	BAYOU FOOD STORES INC/CANAL REFINING CO	SUGARLAND CANAL STATION, RACELAND	RACELAND 4559 HWY 1 S	SERVICE STATION	BAYOU LAFOURCHE	
LA0115177			CENTRAL CRUDE INC	VALENTINE TERMINAL	9793 HIGHWAY 308	OIL STORAGE	BAYOU LAFOURCHE	
WG010218		LAG530127	CHINA GARDENS	FORMER GWEN WONG RESTAURANT	THIBODAUX, 1400 ST MARY STREET	EXTENDED AERATION (4510 GPD)	BAYOU LAFOURCHE	
WG020794		LAG540498	COMMERCIAL PROPERTIES DEV CORP	MATHEWS SHOPPING CENTER	MATHEWS, HWY 1	SEWERAGE PLANT	BAYOU LAFOURCHE	
WP4367			EXXON PIPELINE CO	RACELAND STORAGE FACILITY	RACELAND	OIL STORAGE	BAYOU LAFOURCHE	
WP4146	LA0095788		GAUBERT OIL CO INC	GAUBET OIL FOOD MART	THIBODAUX, 1501 ST. MARY HWY	SERVICE STATION	BAYOU LAFOURCHE	5411
WP4732	LAR05M053	LA0102989	HALTER MARINE	HALTER MARINE LOCKPORT	LOCKPORT, HWY 308	SHIPYARD	BAYOU LAFOURCHE	3731
GP14442		LAG75018	HILL CITY OIL CO INC	EXXON JUBILEE #610	105 HWY 70 SPUR	SERVICE STATION	BAYOU LAFOURCHE	
WP0838			J R ENTERPRISES	WET SPOT CARWASH	MATHEWS, HWY 1	CAR WASH	BAYOU LAFOURCHE	
WG010581		LAG530272	JIM'S FROSTOPS INC	RACELAND FROSTOP	RACELAND, HWY 1 AND ST. LOUIS ST	RESTAURANT	BAYOU LAFOURCHE	4952
WG080179		LAG750171	JOEY'S CAR WASH	LOCKPORT	LOCKPORT, 5609 HWY 1	CAR WASH	BAYOU LAFOURCHE	
WG010063		LAG530290	LA DEPT OF TRANS & DEVELOPMENT	BAYOU LAFROUCHE BRIDGE, LOCKPORT	LOCKPORT, ACR BAYOU LAFOURCHE LA3220	BRIDGE	BAYOU LAFOURCHE	4952
LAG530307			LA DEPT OF TRANS & DEVELOPMENT	LAROSE PONTOON BRIDGE	ROUTE LA 310 OVER BAYOU LAFOURCHE,LAROSE	BRIDGE	BAYOU LAFOURCHE	
WG020423	LA0063303	LAG540364	LAFOURCHE PARISH HOUSING AUTHORITY	RACELAND FACILITY	RACELAND, HWY 308	SEWERAGE PLANT	BAYOU LAFOURCHE	
GP16095		LAG540861	LAFOURCHE PARISH RECREATION DIST #2	RACELAND	RECREATION DRIVE, NEAR POST OFFICE	SEWERAGE PLANT	BAYOU LAFOURCHE	
WG020923		LAG540463	LAFOURCHE PARISH SCHOOL BOARD	ST CHARLES ELEMENTARY SCHOOL	ST CHARLES, 5 MI S @ 1690 HWY 1	SEWERAGE	BAYOU LAFOURCHE	
WP4306			LINCOLN BIG 3 INC	THIBODAUX	THIBODAUX, HWY 308	ACETYLENE PRODUCTION	BAYOU LAFOURCHE	
WG010079		LAG530342	LOCKPORT VOLUNTEER FIRE DEPT	308 STATION	LOCKPORT, 1.5 MI S OF VALENTINE BRG LA 1	SEWERAGE PLANT	BAYOU LAFOURCHE	
WG010078		LAG530343	LOCKPORT VOLUNTEER FIRE DEPT	VALENTINE STATION	LOCKPORT, RT 1, BOX 183A, S OF VALENTINE	SEWERAGE PLANT	BAYOU LAFOURCHE	
WP5103			LYTAL MARINE OPERATORS INC	LOCKPORT	LOCKPORT	MARINE VESSEL	BAYOU LAFOURCHE	
WP2236			MR BT'S MOBILE HOME PARK	THIBODAUX	THIBODAUX	SEWERAGE PLANT	BAYOU LAFOURCHE	
GP16128	LA0107174		PELTS & SKINS EXPORT LTD	LOCKPORT	502 EAST MAIN, LOCKPORT	ALLIGATOR FARM	BAYOU LAFOURCHE	2091
WG020565		LAG530439	RACELAND DAIRY KOOL	RACELAND	RACELAND, 3821 HWY 1	SEWERAGE PLANT	BAYOU LAFOURCHE	4952
GP12658		LAG530461	RICHARD LEDET'S TRAILER PARK	LOCKPORT	LOCKPORT, 211 - 215 N WILLOW STREET	SEWERAGE PLANT	BAYOU LAFOURCHE	
GP17026		LAG540953	ROGERS TRAILER PARK	LOCKPORT	LOCKPORT, OFF HWY 308 NEAR PANKYS	OXIDATION POND	UNNAMED DITCH TO BAYOU LAFOURCHE	6515
WP1979		LAG750359	SCRUBBS CARWASH	RACELAND	RACELAND, 3895 HWY 1	CAR WASH	BAYOU LAFOURCHE	
WP1369		LAG330192	TRANSWORLD EXPLORATION & PRODUCTION	LOCKPORT	LOCKPORT	E&P	BAYOU LAFOURCHE	
LAR05M268			WALMART OF SOUTH LA	WALMART OF SOUTH LA	RACELAND, 143 HWY 3199	DEPARTMENT STORE	BAYOU LAFOURCHE	
LA0094978			WASTE MANAGEMENT OF LOUISIANA	LAFOURCHE RECYCLING CENTER	RACELAND, 143 HWY 3199	(SW)DISPOSAL	BAYOU LAFOURCHE	4953

FILE: R:\PROJECTS\2110-610\NPDES\PERMIT_LIST_020401.XLS

APPENDIX B

Figures 3.1 Through 3.15

Figure 3.1. Long Term Plot of Fecal Coliform Data for Station 0023

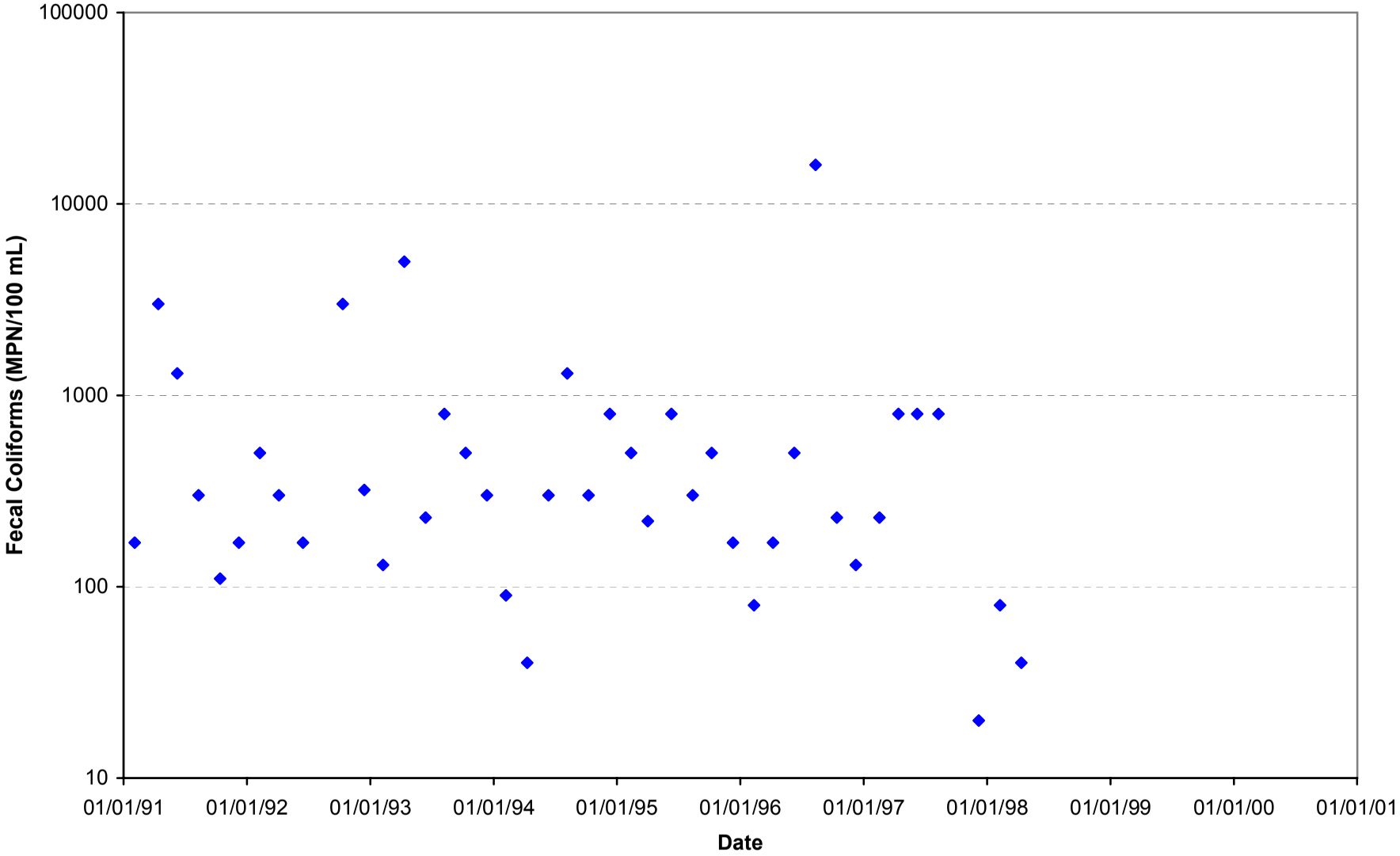


Figure 3.2. Long Term Plot of Fecal Coliform Data for Station 0293

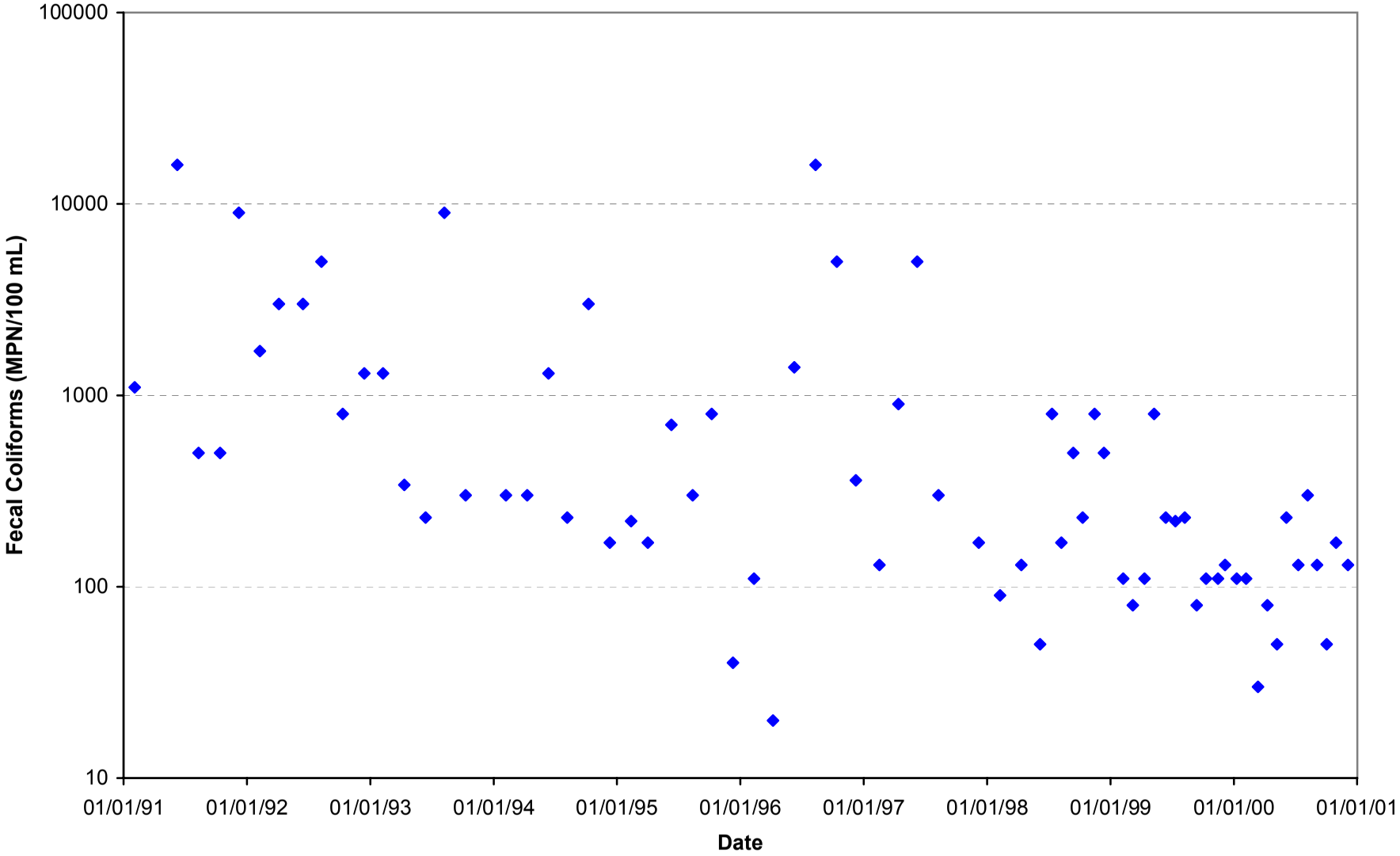


Figure 3.3. Long Term Plot of Fecal Coliform Data for Station 0112

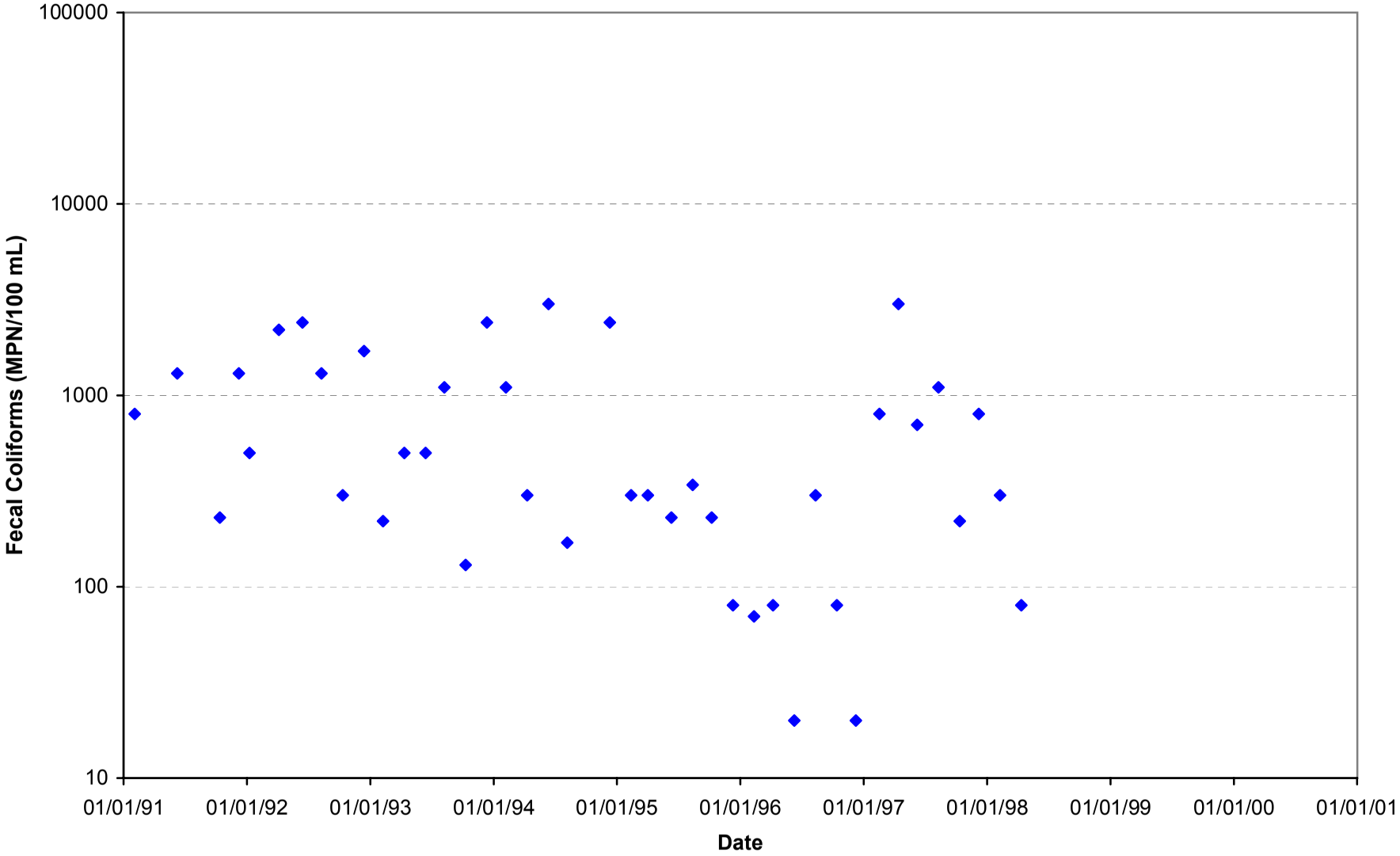


Figure 3.4. Long Term Plot of Fecal Coliform Data for Station 0294

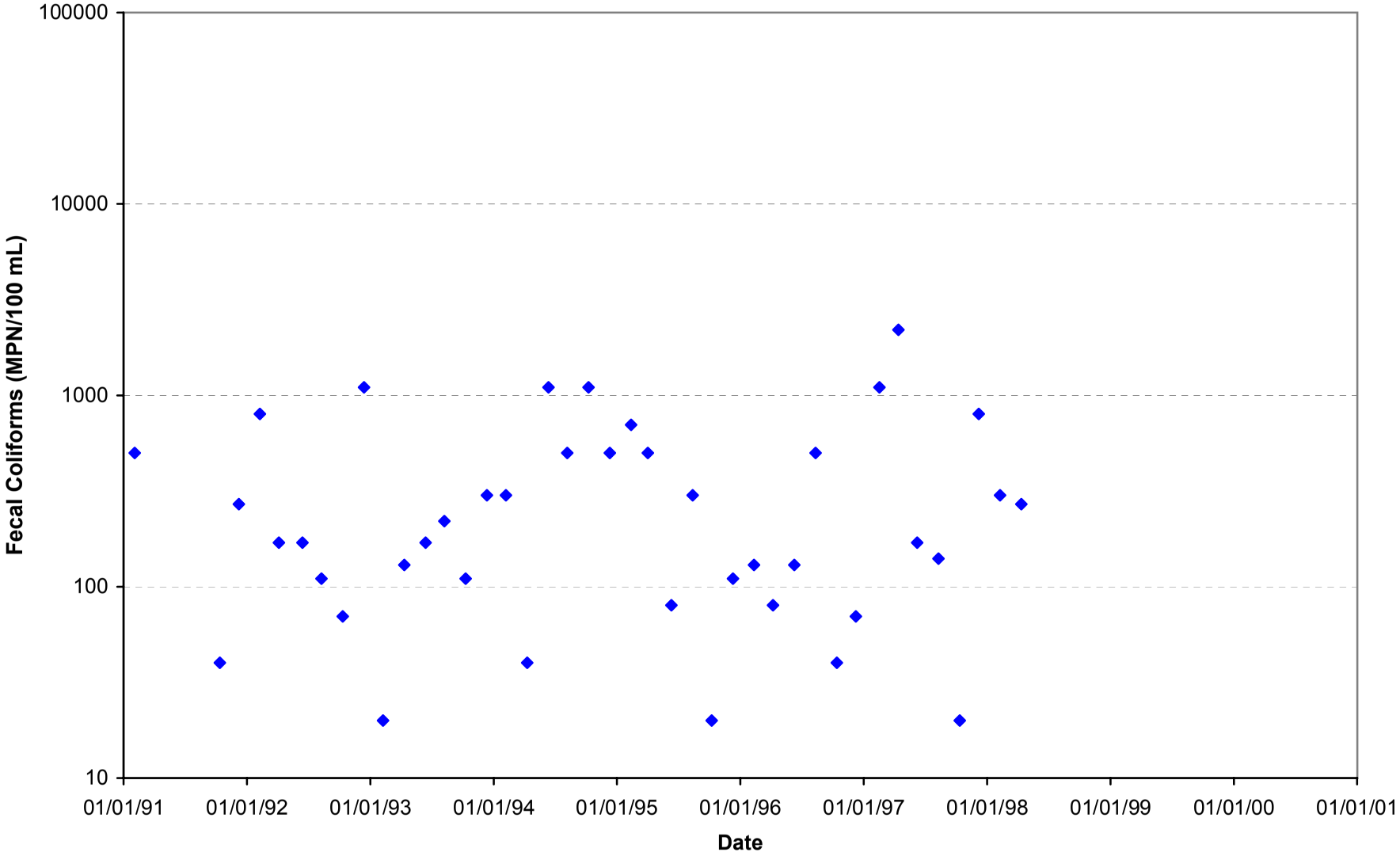


Figure 3.5. Long Term Plot of Fecal Coliform Data for Station 0111

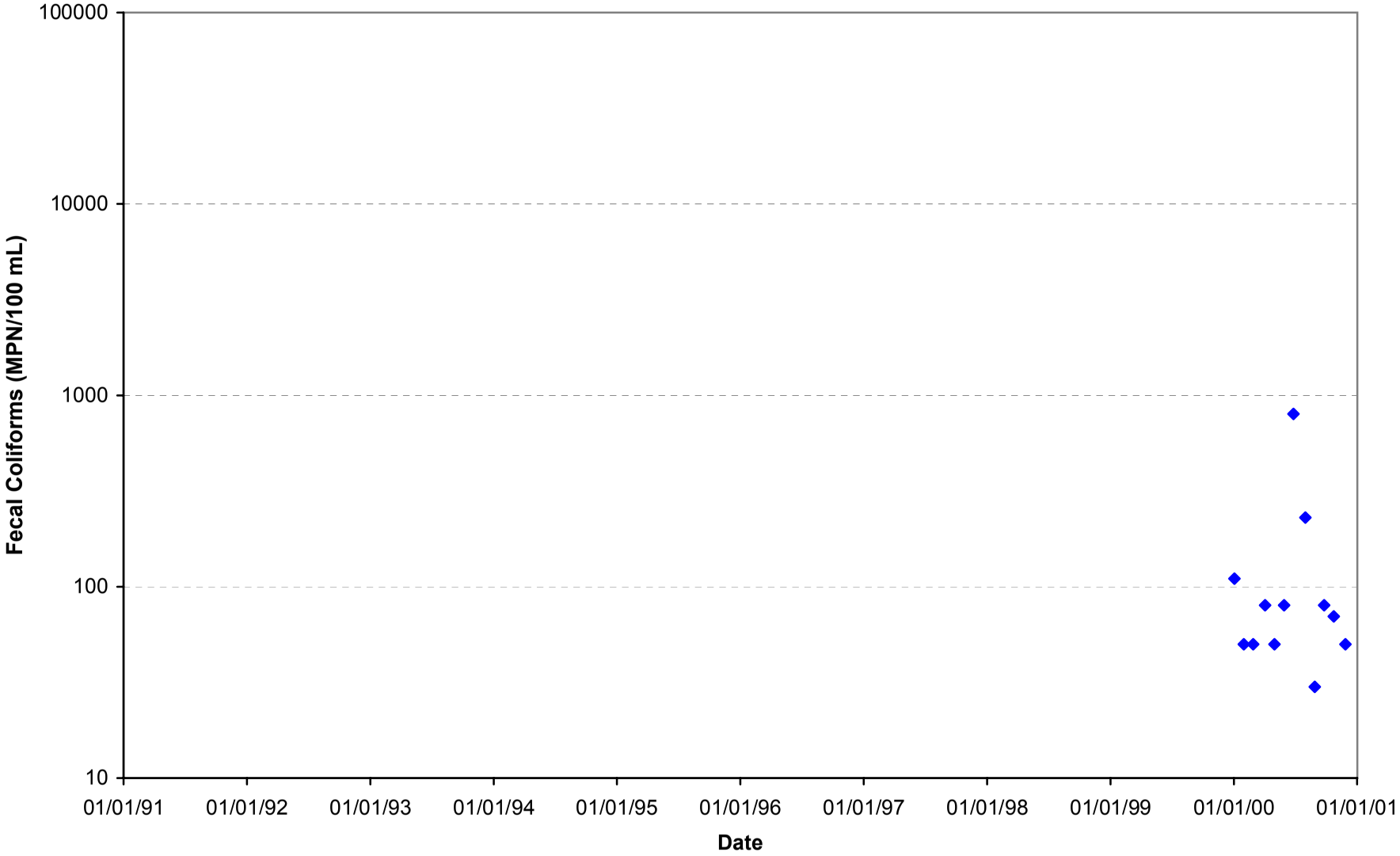


Figure 3.6. Fecal Coliform Counts at Station 0023 vs. 3-day Precipitation

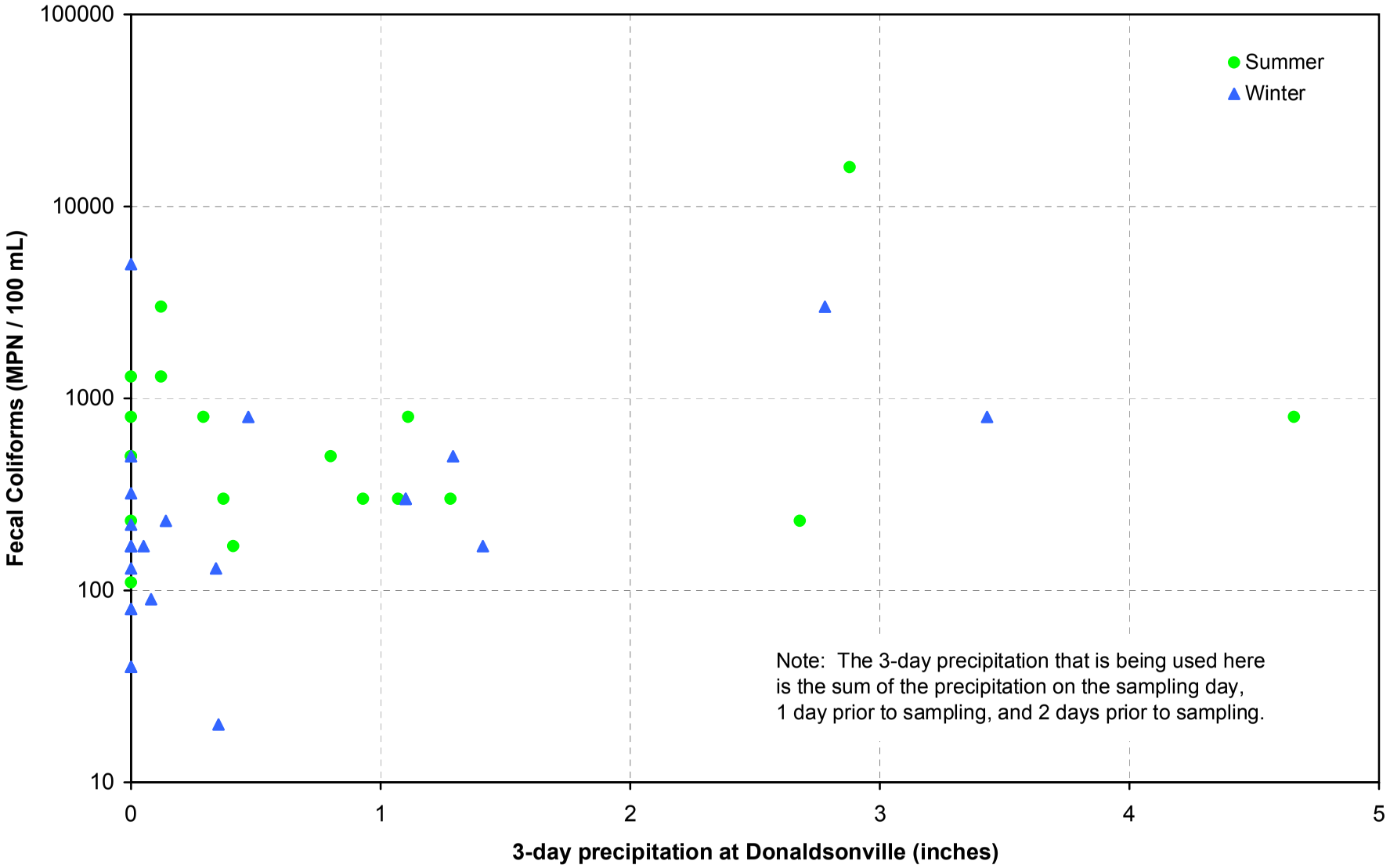


Figure 3.7. Fecal Coliform Counts at Station 0293 vs. 3-day Precipitation

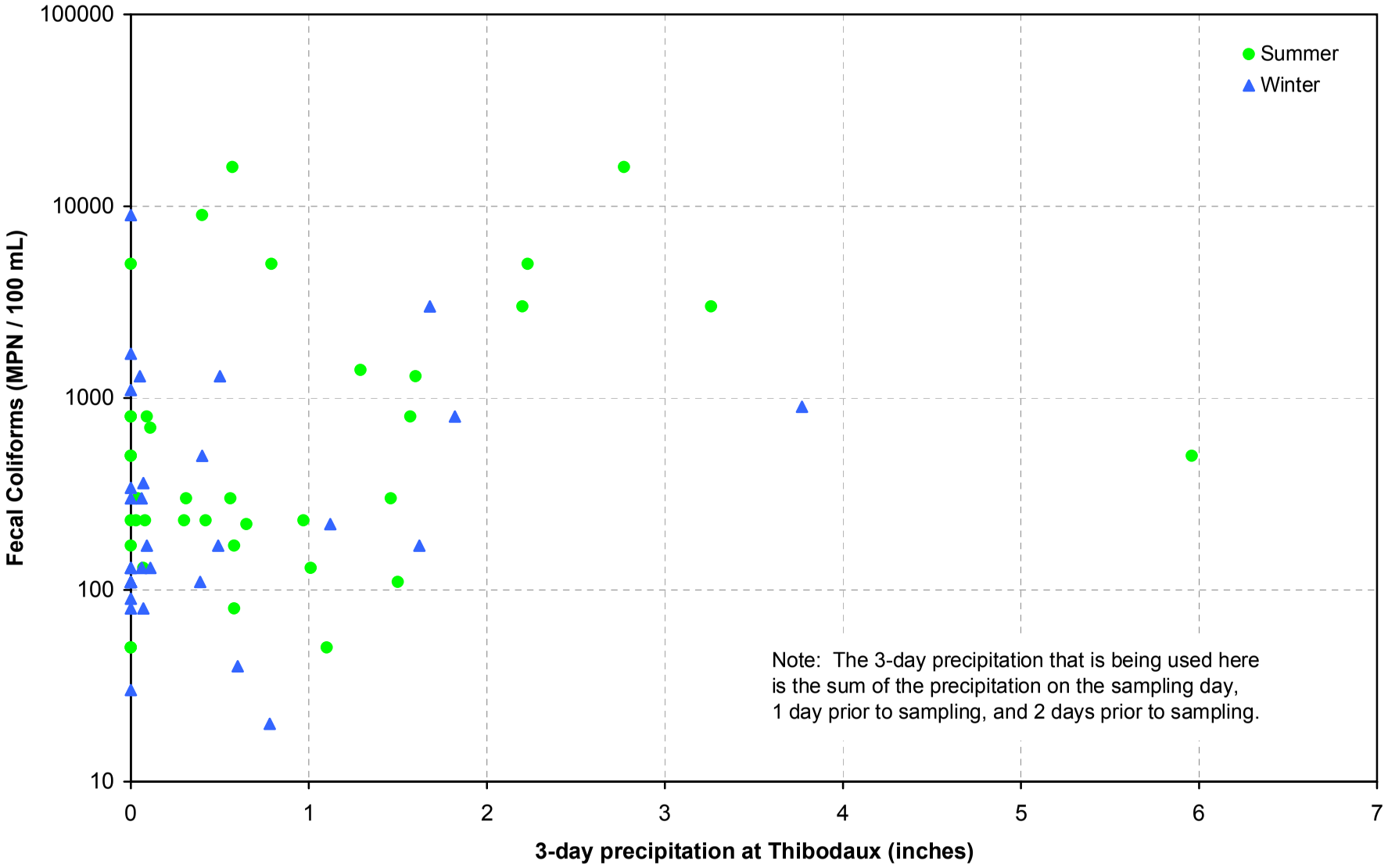


Figure 3.8. Fecal Coliform Counts at Station 0112 vs. 3-day Precipitation

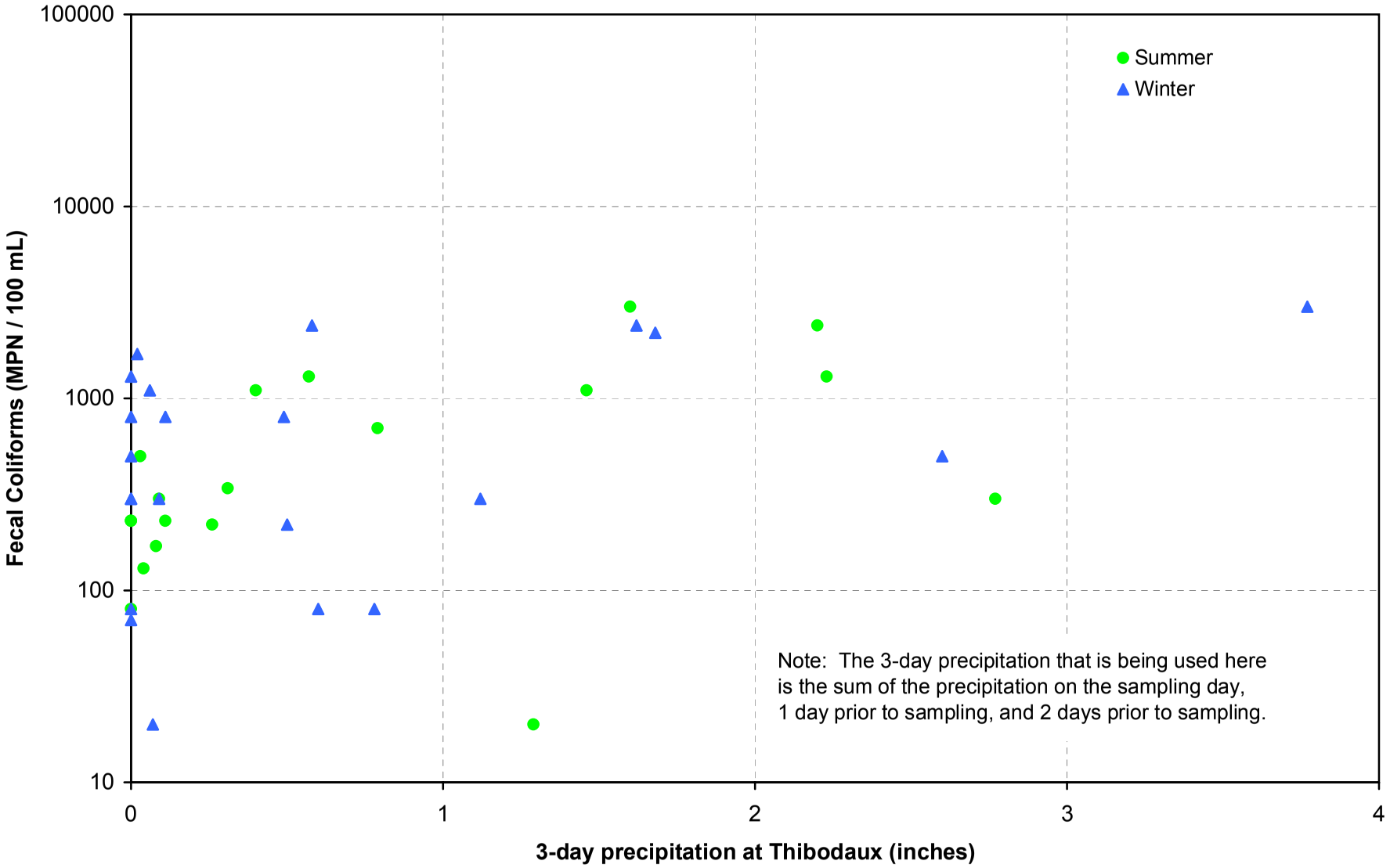


Figure 3.9. Fecal Coliform Counts at Station 0294 vs. 3-day Precipitation

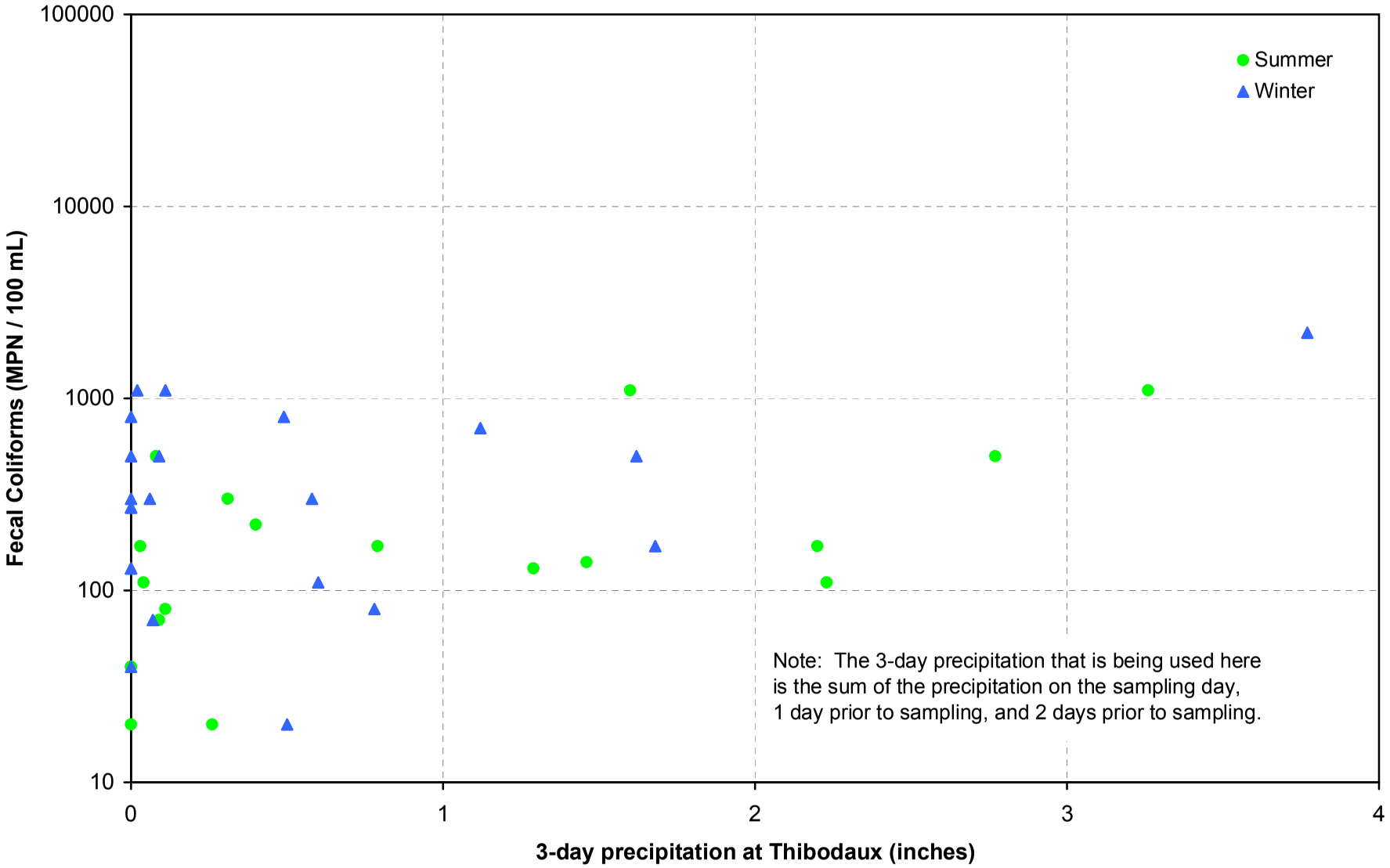


Figure 3.10. Fecal Coliform Counts at Station 0111 vs. 3-day Precipitation

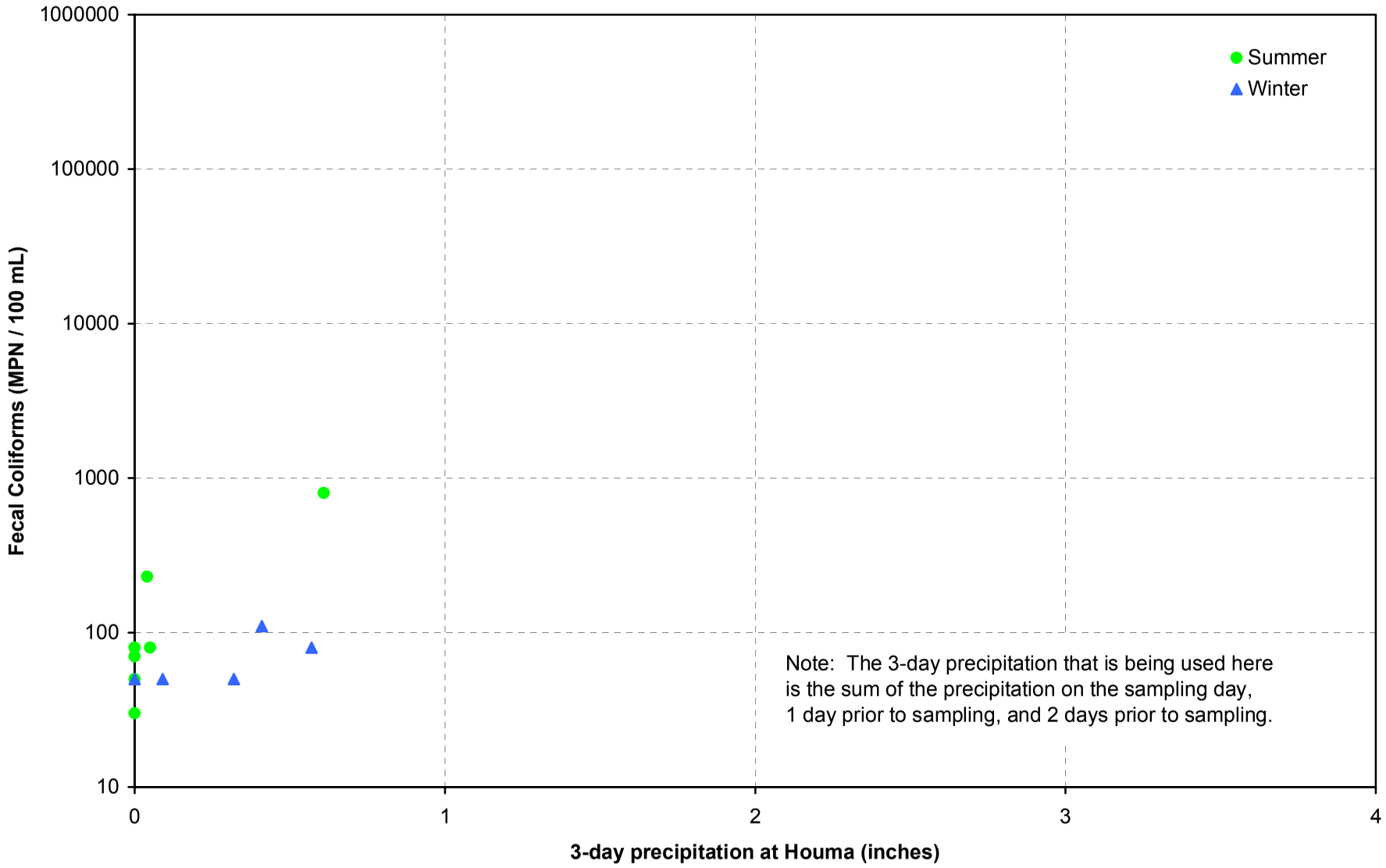


Figure 3.11. Seasonal Plot of Fecal Coliform Data for Station 0023

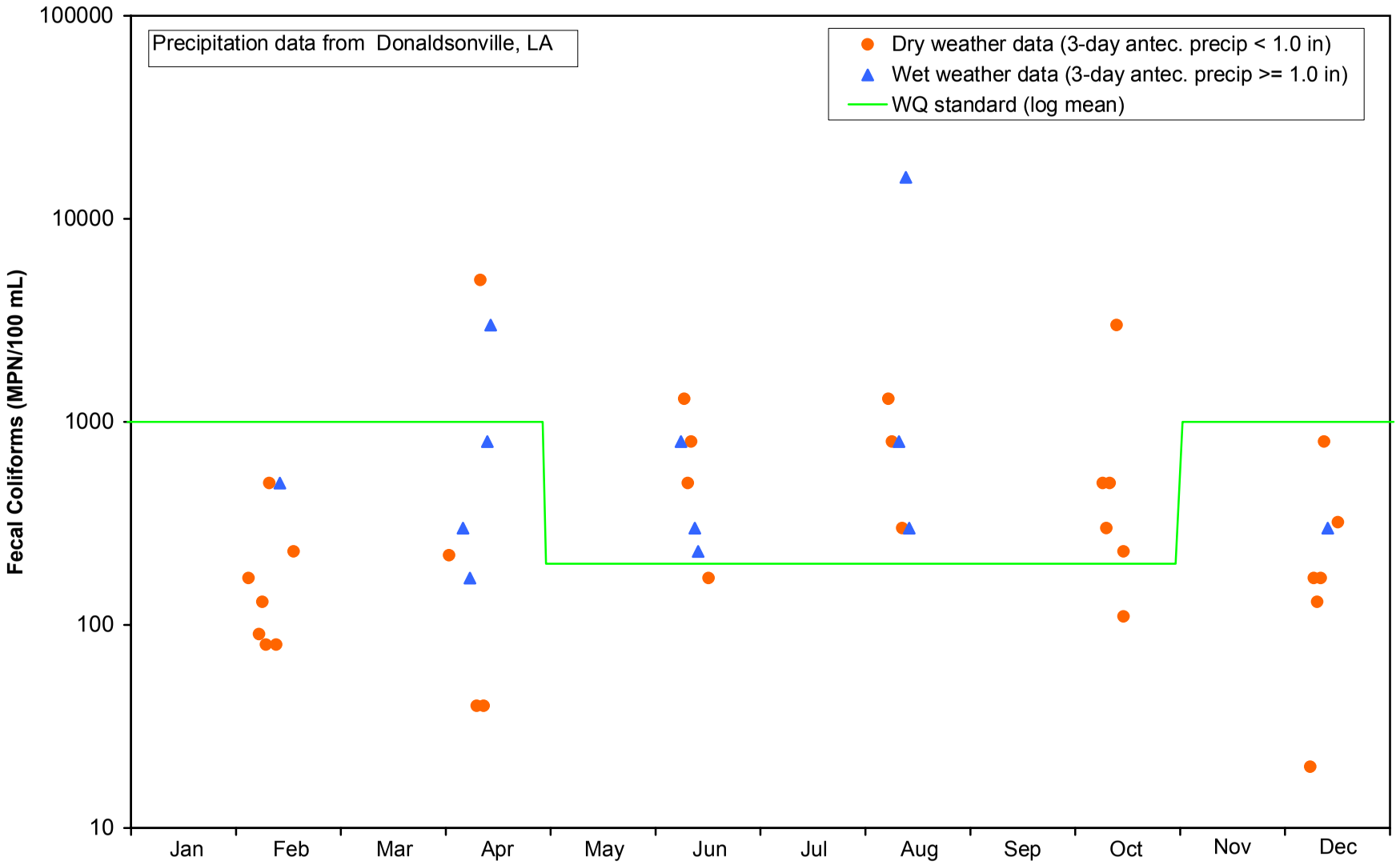


Figure 3.12. Seasonal Plot of Fecal Coliform Data for Station 0293

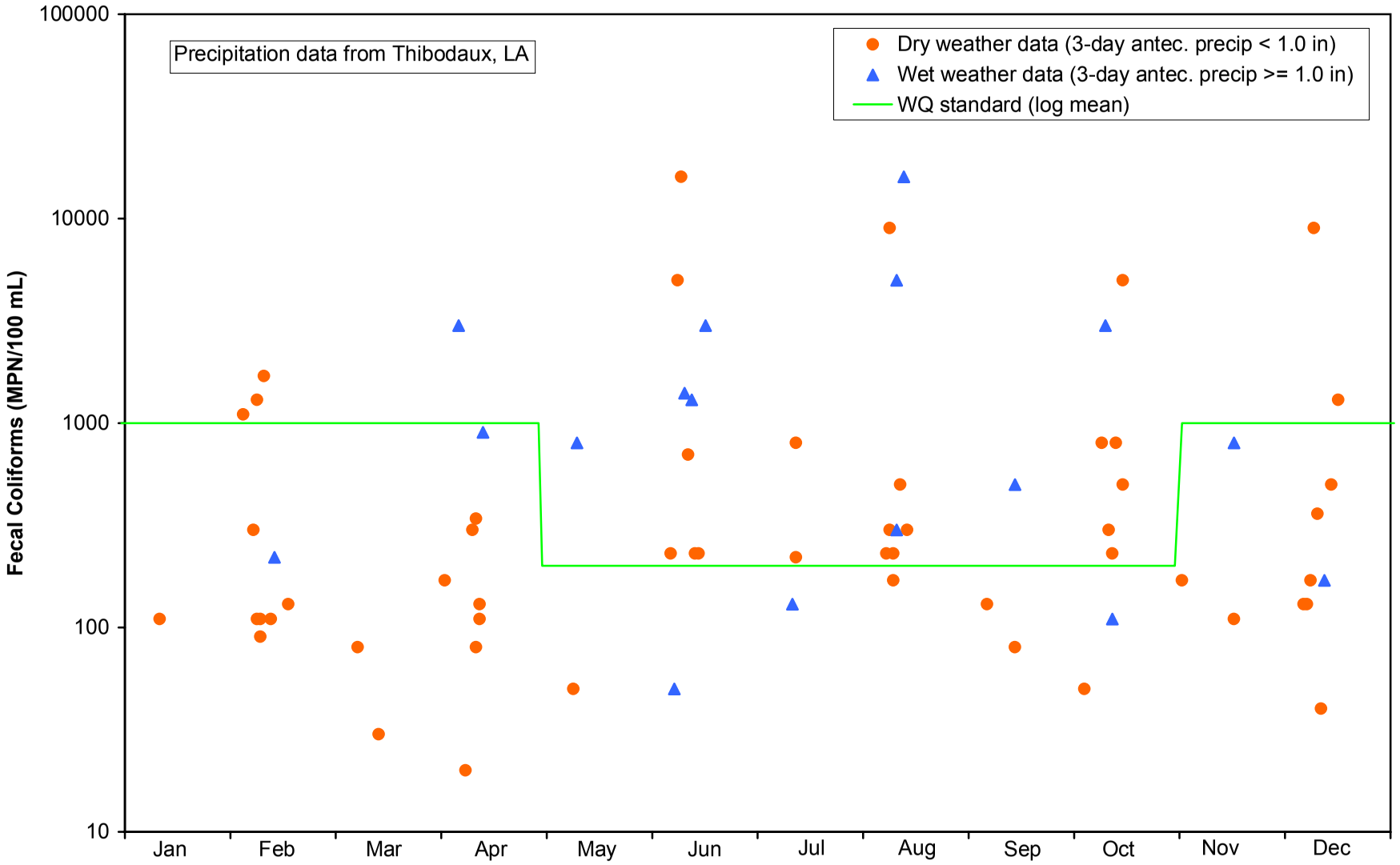


Figure 3.13. Seasonal Plot of Fecal Coliform Data for Station 0112

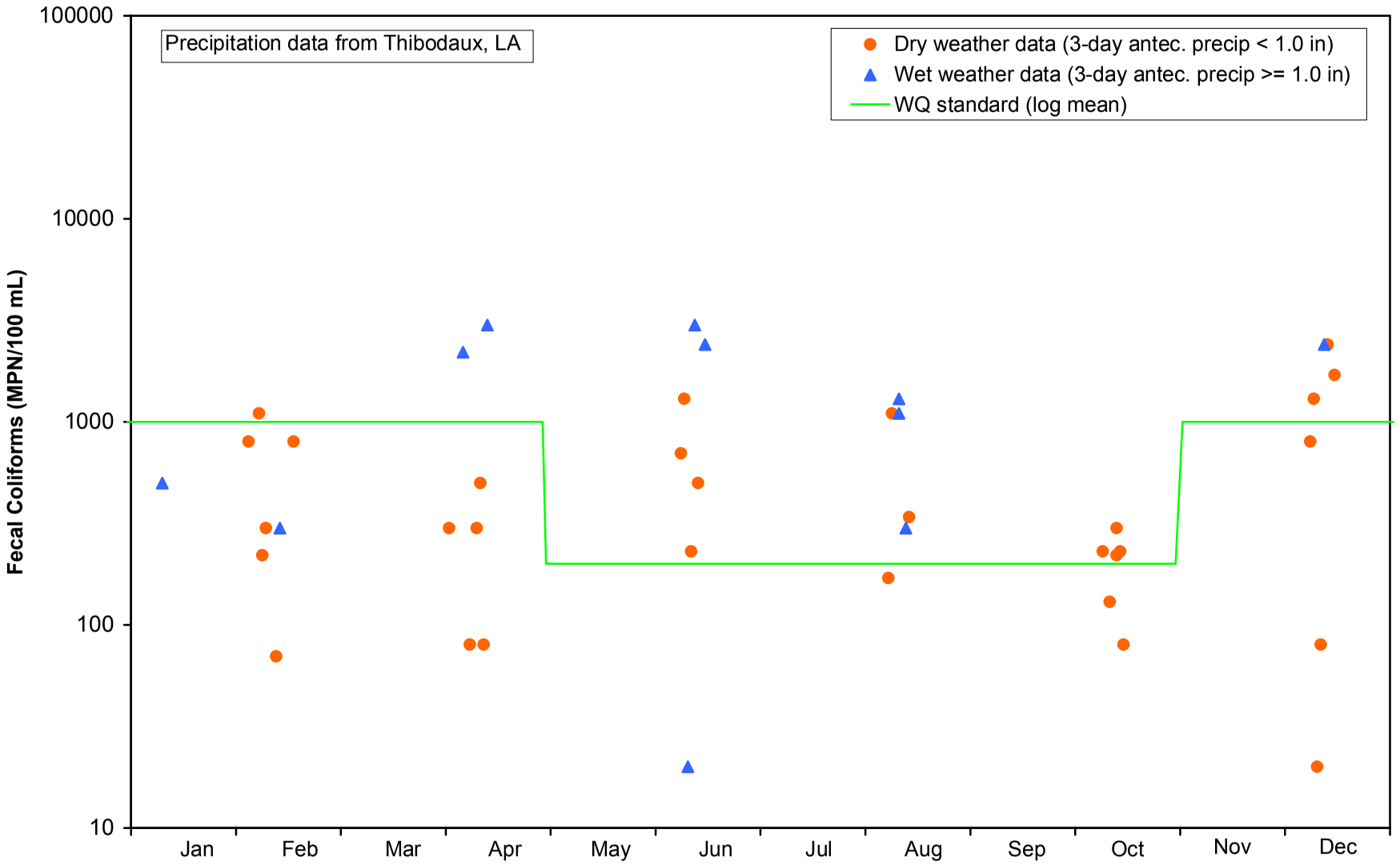


Figure 3.14. Seasonal Plot of Fecal Coliform Data for Station 0294

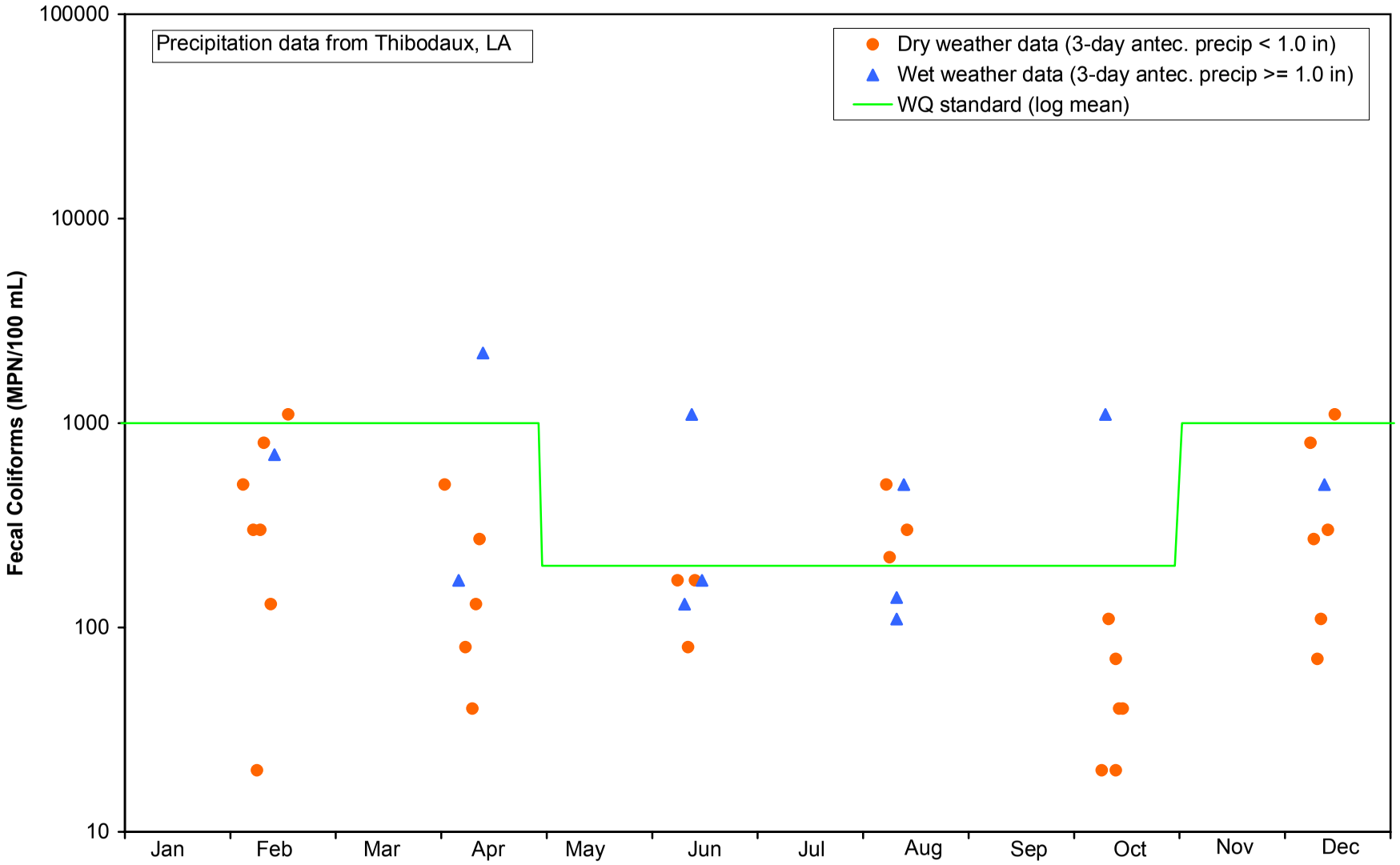
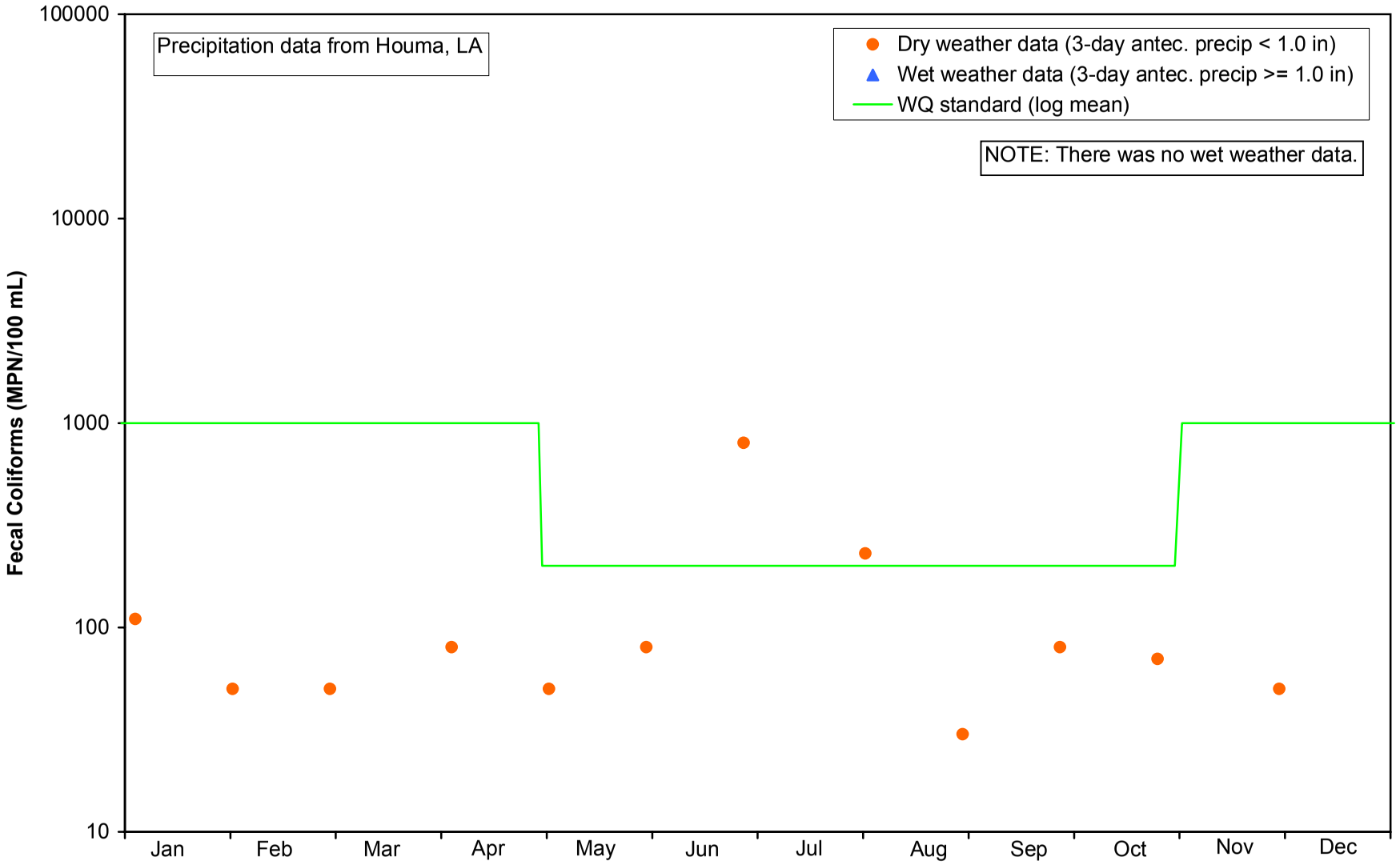


Figure 3.15. Seasonal Plot of Fecal Coliform Data for Station 0111



APPENDIX D

Percent Reduction Calculations

Summer (May-Oct) Fecal Coliform Data for Bayou Lafourche at Station 0023
Bayou Lafourche near Donaldsonville, Louisiana

Minimum fecal coliform count for applying reduction = 200

Date	Time	Season	Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
6/10/91	1020	summer	1300	77%	299
8/12/91	1030	summer	300	77%	69
10/15/91	1020	summer	110	--	110
6/16/92	1000	summer	170	--	170
10/12/92	1015	summer	3000	77%	690
6/14/93	0945	summer	230	77%	53
8/9/93	0945	summer	800	77%	184
10/11/93	1020	summer	500	77%	115
6/13/94	1005	summer	300	77%	69
8/8/94	0950	summer	1300	77%	299
10/10/94	0945	summer	300	77%	69
6/12/95	1030	summer	800	77%	184
8/14/95	1100	summer	300	77%	69
10/9/95	1145	summer	500	77%	115
6/10/96	0920	summer	500	77%	115
8/12/96	0930	summer	16000	77%	3680
10/14/96	0950	summer	230	77%	53
6/9/97	1000	summer	800	77%	184
8/11/97	1000	summer	800	77%	184

Existing summer log mean = 581
Summer WQ standard for log mean (primary contact recr.) = 200
Explicit margin of safety (20%) = 40
Target value for summer log mean = 160
Summer log mean after reductions = 156

Existing summer 75th percentile = 800
Summer WQ standard for 75th %tile (primary contact recr.) = 400
Explicit margin of safety (20%) = 80
Target value for summer 75th percentile = 320
Summer 75th percentile after reductions = 184

* Note: Reduction was applied only to observed data that were greater than 200 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0023.XLS

Winter (Nov-Apr) Fecal Coliform Data for Bayou Lafourche at Station 0023
Bayou Lafourche near Donaldsonville, Louisiana

Minimum fecal coliform count for applying reduction = 1000

Date	Time	Season	Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
2/4/91	35	winter	170	--	170
4/15/91	105	winter	3000	0%	3000
12/9/91	343	winter	170	--	170
2/10/92	41	winter	500	--	500
4/6/92	97	winter	300	--	300
12/15/92	350	winter	320	--	320
2/8/93	39	winter	130	--	130
4/12/93	102	winter	5000	0%	5000
12/13/93	347	winter	300	--	300
2/7/94	38	winter	90	--	90
4/11/94	101	winter	40	--	40
12/12/94	346	winter	800	--	800
2/13/95	44	winter	500	--	500
4/3/95	93	winter	220	--	220
12/11/95	345	winter	170	--	170
2/12/96	43	winter	80	--	80
4/8/96	99	winter	170	--	170
12/9/96	344	winter	130	--	130
2/17/97	48	winter	230	--	230
4/14/97	104	winter	800	--	800
12/8/97	342	winter	< 20	--	20
2/9/98	40	winter	80	--	80
4/13/98	103	winter	40	--	40

Existing winter log mean = 222
Winter WQ standard for log mean (secondary contact recr.) = 1000
Explicit margin of safety (20%) = 200
Target value for winter log mean = 800
Winter log mean after reductions = 222

Existing winter 75th percentile = 410
Winter WQ standard for 75th %tile (secondary contact recr.) = 2000
Explicit margin of safety (20%) = 400
Target value for winter 75th percentile = 1600
Winter 75th percentile after reductions = 410

* Note: Reduction was applied only to observed data that were greater than 1000 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0023.XLS

Summer (May-Oct) Fecal Coliform Data for Bayou LaFourche at Station 0293
Bayou Lafourche at Thibodaux, Louisiana

Minimum fecal coliform count for applying reduction = 200

Date	Time	Season	Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
10/31/00	0935	summer	170	--	170
10/3/00	1020	summer	50	--	50
9/5/00	1000	summer	130	--	130
8/8/00	1015	summer	300	75%	75
7/11/00	0920	summer	130	--	130
6/6/00	0955	summer	230	75%	58
5/9/00	0955	summer	50	--	50
10/12/99	0940	summer	110	--	110
9/14/99	1000	summer	80	--	80
8/10/99	1000	summer	230	75%	58
7/13/99	1100	summer	220	75%	55
6/15/99	0935	summer	230	75%	58
5/11/99	1112	summer	800	75%	200
10/12/98	1023	summer	230	75%	58
9/14/98	1015	summer	500	75%	125
8/10/98	1010	summer	170	--	170
7/13/98	1015	summer	800	75%	200
6/8/98	1040	summer	50	--	50
8/11/97	1110	summer	300	75%	75
6/9/97	1100	summer	5000	75%	1250
10/14/96	1100	summer	5000	75%	1250
8/12/96	1040	summer	16000	75%	4000
6/10/96	1035	summer	1400	75%	350
10/9/95	1045	summer	800	75%	200
8/14/95	1215	summer	300	75%	75
6/12/95	1130	summer	700	75%	175
10/10/94	1045	summer	3000	75%	750
8/8/94	1100	summer	230	75%	58
6/13/94	0900	summer	1300	75%	325
10/11/93	0900	summer	300	75%	75
8/9/93	0840	summer	9000	75%	2250
6/14/93	0840	summer	230	75%	58
10/12/92	0905	summer	800	75%	200
8/10/92	0910	summer	5000	75%	1250
6/16/92	0900	summer	3000	75%	750
10/15/91	0930	summer	500	75%	125
8/12/91	0940	summer	500	75%	125
6/10/91	0930	summer	16000	75%	4000

Existing summer log mean = 525
Summer WQ standard for log mean (primary contact recr.) = 200

Explicit margin of safety (20%) =		40
Target value for summer log mean =		160
Summer log mean after reductions =		157
Existing summer 75th percentile =	800	
Summer WQ standard for 75th %tile (primary contact recr.) =		400
Explicit margin of safety (20%) =		80
Target value for summer 75th percentile =		320
Summer 75th percentile after reductions =		200

* Note: Reduction was applied only to observed data that were greater than 200 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0293.XLS

Winter (Nov-Apr) Fecal Coliform Data for Bayou LaFourche at Station 0293
Bayou Lafourche at Thibodaux, Louisiana

Minimum fecal coliform count for applying reduction = 1000

Date	Time	Season	Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
12/5/00	340	winter	130	--	130
4/11/00	102	winter	80	--	80
3/14/00	74	winter	30	--	30
2/8/00	39	winter	110	--	110
1/11/00	11	winter	110	--	110
12/7/99	341	winter	130	--	130
11/16/99	320	winter	110	--	110
4/13/99	103	winter	110	--	110
3/9/99	68	winter	80	--	80
2/9/99	40	winter	110	--	110
12/14/98	348	winter	500	--	500
11/16/98	320	winter	800	--	800
4/13/98	103	winter	130	--	130
2/9/98	40	winter	90	--	90
12/8/97	342	winter	170	--	170
4/14/97	104	winter	900	--	900
2/17/97	48	winter	130	--	130
12/9/96	344	winter	360	--	360
4/8/96	99	winter	20	--	20
2/12/96	43	winter	110	--	110
12/11/95	345	winter	40	--	40
4/3/95	93	winter	170	--	170
2/13/95	44	winter	220	--	220
12/12/94	346	winter	170	--	170
4/11/94	101	winter	300	--	300
2/7/94	38	winter	300	--	300
4/12/93	102	winter	340	--	340
2/8/93	39	winter	1300	0%	1300
12/15/92	350	winter	1300	0%	1300
4/6/92	97	winter	3000	0%	3000
2/10/92	41	winter	1700	0%	1700
12/9/91	343	winter	9000	0%	9000
2/4/91	35	winter	1100	0%	1100

Existing winter log mean = 238
Winter WQ standard for log mean (secondary contact recr.) = 1000

Explicit margin of safety (20%) =		200
Target value for winter log mean =		800
Winter log mean after reductions =		238
Existing winter 75th percentile =	500	
Winter WQ standard for 75th %tile (secondary contact recr.) =		2000
Explicit margin of safety (20%) =		400
Target value for winter 75th percentile =		1600
Winter 75th percentile after reductions =		500

* Note: Reduction was applied only to observed data that were greater than 1000 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0293.XLS

Summer (May-Oct) Fecal Coliform Data for Bayou Lafourche at Station 0112
Bayou Lafourche at Raceland, Louisiana

Minimum fecal coliform count for applying reduction = 200

Date	Time	Season	Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
10/13/97	0900	summer	220	71%	64
8/11/97	0935	summer	1100	71%	319
6/9/97	0925	summer	700	71%	203
10/14/96	0930	summer	80	--	80
8/12/96	0849	summer	300	71%	87
6/10/96	0930	summer	20	--	20
10/9/95	0915	summer	230	71%	67
8/14/95	0930	summer	340	71%	99
6/12/95	0835	summer	230	71%	67
8/8/94	0925	summer	170	--	170
6/13/94	0900	summer	3000	71%	870
10/11/93	0840	summer	130	--	130
8/9/93	0830	summer	1100	71%	319
6/14/93	0850	summer	500	71%	145
10/12/92	0855	summer	300	71%	87
8/10/92	0850	summer	1300	71%	377
6/15/92	0845	summer	2400	71%	696
10/14/91	0845	summer	230	71%	67
6/10/91	1030	summer	1300	71%	377

Existing summer log mean = 387
Summer WQ standard for log mean (primary contact recr.) = 200
Explicit margin of safety (20%) = 40
Target value for summer log mean = 160
Summer log mean after reductions = 146

Existing summer 75th percentile = 1100
Summer WQ standard for 75th %tile (primary contact recr.) = 400
Explicit margin of safety (20%) = 80
Target value for summer 75th percentile = 320
Summer 75th percentile after reductions = 319

* Note: Reduction was applied only to observed data that were greater than 200 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0112.XLS

Winter (Nov-Apr) Fecal Coliform Data for Bayou Lafourche at Station 0112
Bayou Lafourche at Raceland, Louisiana

Minimum fecal coliform count for applying reduction = 1000

Date	Time	Season	Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
4/13/98	0900	winter	80	--	80
2/9/98	0830	winter	300	--	300
12/8/97	0830	winter	800	--	800
4/14/97	0925	winter	3000	0%	3000
2/17/97	0945	winter	800	--	800
12/9/96	0930	winter	20	--	20
4/8/96	0930	winter	80	--	80
2/12/96	0930	winter	70	--	70
12/11/95	0935	winter	80	--	80
4/3/95	0915	winter	300	--	300
2/13/95	0930	winter	300	--	300
12/12/94	0845	winter	2400	0%	2400
4/11/94	0845	winter	300	--	300
2/7/94	0840	winter	1100	0%	1100
12/13/93	0830	winter	2400	0%	2400
4/12/93	0835	winter	500	--	500
2/8/93	0940	winter	220	--	220
12/14/92	0835	winter	1700	0%	1700
4/6/92	0845	winter	2200	0%	2200
1/10/92	0825	winter	500	--	500
12/9/91	0850	winter	1300	0%	1300
2/4/91	1040	winter	800	--	800

Existing winter log mean = 441
Winter WQ standard for log mean (secondary contact recr.) = 1000
Explicit margin of safety (20%) = 200
Target value for winter log mean = 800
Winter log mean after reductions = 441

Existing winter 75th percentile = 1250
Winter WQ standard for 75th %tile (secondary contact recr.) = 2000
Explicit margin of safety (20%) = 400
Target value for winter 75th percentile = 1600
Winter 75th percentile after reductions = 1250

* Note: Reduction was applied only to observed data that were greater than 1000 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0112.XLS

Summer (May-Oct) Fecal Coliform Data for Bayou LaFourche at Station 0294
Bayou Lafourche at Lockport, Louisiana

Minimum fecal coliform count for applying reduction = 200

Date	Time	Season		Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
10/13/97	0830	summer	<	20	--	20
8/11/97	0915	summer		140	--	140
6/9/97	0900	summer		170	--	170
10/14/96	0900	summer		40	--	40
8/12/96	1139	summer		500	0%	500
6/10/96	0900	summer		130	--	130
10/9/95	0900	summer	<	20	--	20
8/14/95	0900	summer		300	0%	300
6/12/95	0815	summer		80	--	80
10/10/94	0900	summer		1100	0%	1100
8/8/94	0900	summer		500	0%	500
6/13/94	0830	summer		1100	0%	1100
10/11/93	1100	summer		110	--	110
8/9/93	0815	summer		220	0%	220
6/14/93	0815	summer		170	--	170
10/12/92	0810	summer		70	--	70
8/10/92	0810	summer		110	--	110
6/15/92	0815	summer		170	--	170
10/14/91	0810	summer		40	--	40
6/10/91	0000	summer			--	

Existing summer log mean =	142	
Summer WQ standard for log mean (primary contact recr.) =		200
Explicit margin of safety (20%) =		40
Target value for summer log mean =		160
Summer log mean after reductions =		142
Existing summer 75th percentile =	260	
Summer WQ standard for 75th %tile (primary contact recr.) =		400
Explicit margin of safety (20%) =		80
Target value for summer 75th percentile =		320
Summer 75th percentile after reductions =		260

* Note: Reduction was applied only to observed data that were greater than 200 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0294.XLS

Winter (Nov-Apr) Fecal Coliform Data for Bayou LaFourche at Station 0294
Bayou Lafourche at Lockport, Louisiana

Minimum fecal coliform count for applying reduction = 1000

Date	Time	Season	Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
4/13/98	103	winter	270	--	270
2/9/98	40	winter	300	--	300
12/8/97	342	winter	800	--	800
4/14/97	104	winter	2200	0%	2200
2/17/97	48	winter	1100	0%	1100
12/9/96	344	winter	70	--	70
4/8/96	99	winter	80	--	80
2/12/96	43	winter	130	--	130
12/11/95	345	winter	110	--	110
4/3/95	93	winter	500	--	500
2/13/95	44	winter	700	--	700
12/12/94	346	winter	500	--	500
4/11/94	101	winter	40	--	40
2/7/94	38	winter	300	--	300
12/13/93	347	winter	300	--	300
4/12/93	102	winter	130	--	130
2/8/93	39	winter	20	--	20
12/14/92	349	winter	1100	0%	1100
4/6/92	97	winter	170	--	170
2/10/92	41	winter	800	--	800
12/9/91	343	winter	270	--	270
2/4/91	35	winter	500	--	500

Existing winter log mean = 274
Winter WQ standard for log mean (secondary contact recr.) = 1000
Explicit margin of safety (20%) = 200
Target value for winter log mean = 800
Winter log mean after reductions = 274

Existing winter 75th percentile = 650
Winter WQ standard for 75th %tile (secondary contact recr.) = 2000
Explicit margin of safety (20%) = 400
Target value for winter 75th percentile = 1600
Winter 75th percentile after reductions = 650

* Note: Reduction was applied only to observed data that were greater than 1000 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0294.XLS

Summer (May-Oct) Fecal Coliform Data for Bayou Lafourche at Station 0111
Bayou Lafourche at Larose, Louisiana

Minimum fecal coliform count for applying reduction = 200

Date	Time	Season	Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
10/24/00	1025	summer	70	--	70
9/26/00	1020	summer	80	--	80
8/29/00	1020	summer	30	--	30
8/1/00	1020	summer	230	0%	230
6/27/00	1025	summer	800	0%	800
5/30/00	1035	summer	80	--	80
5/2/00	1025	summer	50	--	50

Existing summer log mean =	103	
Summer WQ standard for log mean (primary contact recr.) =		200
Explicit margin of safety (20%) =		40
Target value for summer log mean =		160
Summer log mean after reductions =		103
Existing summer 75th percentile =	155	
Summer WQ standard for 75th %tile (primary contact recr.) =		400
Explicit margin of safety (20%) =		80
Target value for summer 75th percentile =		320
Summer 75th percentile after reductions =		155

* Note: Reduction was applied only to observed data that were greater than 200 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0111.XLS

Winter (Nov-Apr) Fecal Coliform Data for Bayou Lafourche at Station 0111
Bayou Lafourche at Larose, Louisiana

Minimum fecal coliform count for applying reduction = 1000

Date	Time	Season	Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
11/28/00	1030	winter	50	--	50
4/4/00	1010	winter	80	--	80
2/29/00	0955	winter	50	--	50
2/1/00	1015	winter	50	--	50
1/4/00	1050	winter	110	--	110

Existing winter log mean =	64	
Winter WQ standard for log mean (secondary contact recr.) =		1000
Explicit margin of safety (20%) =		200
Target value for winter log mean =		800
Winter log mean after reductions =		64

Existing winter 75th percentile =	80	
Winter WQ standard for 75th %tile (secondary contact recr.) =		2000
Explicit margin of safety (20%) =		400
Target value for winter 75th percentile =		1600
Winter 75th percentile after reductions =		80

* Note: Reduction was applied only to observed data that were greater than 1000 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0111.XLS

APPENDIX E

Responses to Comments

COMMENTS AND RESPONSES
TMDL FOR FECAL COLIFORMS FOR BAYOU LAFOURCHE (SUBSEGMENT 020401)
May 21, 2004

EPA appreciates all comments concerning these TMDLs. Comments that were received are shown below with EPA responses or notes inserted in a different font.

COMMENTS FROM LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY:

The Louisiana Department of Environmental Quality (LDEQ) has reviewed the TMDL for Bayou LaFourche for fecal coliform noticed in the February 9, 2004 Federal Register (Volume 69, Number 26). This TMDL was prepared by a contractor for Region 6 EPA. LDEQ's comments are presented below.

In general, LDEQ does not believe that the TMDL concept was intended to address fecal coliform bacteria. Bacteria are living organisms and are not suited to mathematical computations to estimate loading. In the aquatic environment, bacteria reproduce and die off at rates that vary as in-stream and climatic conditions vary.

Response: Because this subsegment was on the 303(d) list for fecal coliforms, a TMDL for fecal coliforms was developed as required by federal law. Although the methodology used for this TMDL did not include detailed analyses of bacteria reproduction and die-off, this TMDL does satisfy the requirements of Section 303(d) of the Clean Water Act and 40 CFR 130.7.

This TMDL indicates that a 47% reduction in the bacteria load from the Mississippi River (pumped water) would be necessary to meet the standard for primary contact recreation in Bayou Lafourche. The pumped water from the Mississippi River was calculated to comprise 88% of the source of fecal coliform in Bayou Lafourche. All other sources were insignificant by comparison. Since the Mississippi River drains over 40% of the conterminous United States, and Bayou Lafourche is a distributary of the Mississippi River, achieving this reduction in bacteria loading would require reductions throughout the Mississippi River watershed all the way up to Minnesota. The EPA does not adequately address how this would be accomplished.

Response: A detailed plan for implementation is not included in this report because it is not required under current federal TMDL regulations and more data and detailed analyses would be helpful to develop an implementation plan. Section 4.5 of the report states that:

"...this analysis assumed that fecal coliform levels in the Mississippi River were below the log mean water quality standards. Therefore, the Mississippi River water should not be causing any violations of water quality standards in

Bayou Lafourche and no reductions should be required for loading from the Mississippi River. This indicates that the assessment of pollutant sources in Section 4.2 is likely underestimating contributions from sources other than the Mississippi River water (e.g., septic systems, urban runoff, waterfowl and wildlife)."

This TMDL provides initial estimates of loadings from different sources. These estimates were based on existing data and developed with available resources. Development of an implementation plan should include further refinement of these estimates. This TMDL certainly does not propose bacteria reductions "throughout the Mississippi River watershed all the way up to Minnesota".

Reducing the loading by reducing the amount of water pumped into Bayou Lafourche would be in direct conflict with the State's planned increase in flow as part of the coastal restoration program, which is supported by EPA. Reduction in flow would also exacerbate saltwater intrusion from the Gulf into Bayou Lafourche, which is a drinking water source for the communities along the Bayou.

Response: This TMDL does not propose to reduce the amount of water pumped into Bayou Lafourche from the Mississippi River. As stated above, development of an implementation plan should include further refinement of the estimates of loads from different sources.

Beginning in January, LDEQ revised its ambient water quality monitoring cycle to a four-year cycle. LDEQ requests that the EPA TMDL reports be revised to reflect this. A description of the revised monitoring approach is attached for EPA use.

Response: Section 5.0 of the report has been modified to reflect LDEQ's new ambient monitoring cycle.